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AN INVESTIGATION OF ATTITUDES TOWARDS THE USE OF COMPUTER GAMES AND SIMULATIONS IN THE PRIMARY/ELEMENTARY CLASSROOM ENVIRONMENT

John E. Godfreyson

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AN INVESTIGATION OF ATTITUDES TOWARDS THE USE OF COMPUTER GAMES AND SIMULATIONS IN THE PRIMARY/ELEMENTARY CLASSROOM ENVIRONMENT

JOHN ERNST GODFREYSON

August 1984

Supervisor: Dr. Geoff Potter

Abstract

TITLE: An investigation of attitudes towards the use of computer games and simulations in the primary/elementary classroom environment.

The purpose of the project is to examine the attitudes of students, teachers and parents as they pertain to the use of educational computer games and simulations in a teaching/learning situation.

Two courseware packages were selected for implementation in classroom situations. The game, Hurkle was used in two primary classes. The simulation, Oh, Deer ! was used in two elementary classes.

Teaching/learning strategies were designed specifically for the selected courseware considering the age of the children and the learning outcomes of the classroom situation.

Implementation guides were prepared for use by teachers in the selected classrooms.

All of the attitudinal surveys involved the investigation of four main themes : enjoyment, perceived learning effectiveness, group interaction and interaction with the computer/program. Additional questions which were asked varied with the respondent groups. Survey instruments included the use of both interview and questionnaire formats.

The data was analysed using the mean and standard deviation. Data within each category was broken down into various types of respondent groups to discover any variations between the groups.

The project includes the implementation guides which were developed for the selected courseware.

John Ernst Godfreyson

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The University of Victoria deserves commendation for their delivery of Master's Programs to teaching professionals who wish to pursue their graduate education while continuing to work in the education system. Without this type of program many would not have the opportunity or resources to attempt further education of this sort.

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Financial support for the project was provided through grants from the Educational Research Institute of B.C. and the B.C. Teachers Federation.

DEDICATION:

This project is dedicated to children, who through play, learn about the world around them. May they continue to experience the same joy, challenge and satisfaction of learning throughout their lives. May we, as adults and educators, be aware of and encourage that process.

STATEMENT OF PROJECT PURPOSE AND SIGNIFICANCE:

The purpose of the project is to examine the attitudes of students, teachers and parents as they pertain to the use of educational computer games and simulations in a teaching/learning situation.

Predictions seem to indicate the computer will play an increasing role in the lives of present and future generations. Hardware developments have made it possible to extend computing power into the public schools and the home. Software developers, in recognition of a growing market, are becoming increasingly involved in the development of courseware packages.

As with most technological developments in the educational field, there is some doubt as to the appropriateness of this technology to the teaching/learning environment. Students usually adapt and change quickly. Teachers and parents may view this type of change with greater caution.

Studies relating to the effectiveness of computerized courseware have been done and are ongoing. Much of the research has been at the secondary level and other levels of higher education. Less attention has been given to the early stages of education. In addition, many of the studies are narrow in scope, relating to instructional modes often dealing with specific fact or skill type of instruction. Less effort has been directed at the use of computer programs in developing strategy and problem solving abilities.

Another problem deals with the non-integrative approach which has often been a matter of course with computer software. Activities

are often viewed as a replacement for traditional methods. Less emphasis has been placed on using these activities as an integrated part of a larger unit which employs a variety of teaching strategies.

Attitudes often have a considerable effect on the perceived appropriateness and effectiveness of new materials and methods. Research often avoids this issue.

It is the intention of this project to examine the use of computer games and simulations in an attempt to determine what attitudes students, teachers and parents have toward the use of this type of courseware. In addition, some directions for improving the effective use of these types of materials will be suggested.

LITERATURE REVIEW:

There is little doubt that computers will have a significant impact on our daily lives. In fact our lives already reflect the impact of this technology. Eisele (1979, p.13) points out that:

> Today's culture exhibits a strong belief in a commitment to computer technology, the view that learning is personal and individual, the widespread use of technology in all disciplines, and a diversity of social problems which are met head-on with computer technology.

The widespread use of this technology will also have an effect on the social system. Fisher (1982, p.6) suggests that:

> computer-assisted instruction will thrive in the home environment, leaving behind the public schools and less affluent children, thus increasing the gap between them and the well-to-do that already threatens our social stability

It is, therefore, necessary that our approach to education must change to allow for the changes brought about by this technology

(King, 1981, p.16). This integration could bring about substantial change to the curriculum (Moursand, 1981, p.13). The effect will be felt in both the content and process areas (Moursand, 1982, p. 9).

This need for knowledge about and proficiency in the use of computers will be addressed in a number of ways. The aspect of computer literacy is one which is currently receiving a great deal of attention. This, however, is not the area of investigation for this study.

The intent of this review of the literature is to examine the instructional uses of computers with specific emphasis in the area of educational games and simulations. The characteristics and usefulness of this type of courseware will be reviewed.

The use of these games and simulations raises a number of issues. These will be considered in the latter part of the paper which will deal with problems and directions.

Instructional Uses of Microcomputers :

Becker (nd, p.15) suggests six main uses for computers: drill and practice, tutorials, management of instruction, simulations or model building, computer-related skill development (word-processing) and programming.

This part of the paper will deal more specifically with the computer assisted instruction (CAI) modes.

Drill and practice is generally classified as the most elementary type of instructional use of the computer. In many cases it takes the form of a computerized workbook. Often, it may consist of

repeated questions and answers with immediate feedback for correctness of response (Eisele, 1979, p.15). These activities are supposedly designed to teach or reinforce basic skills (Zakariva, 1982, p.19). It has been and may still continue to be for some time the most common instructional use of computers.

The tutorial mode is employed to teach concepts in a sequential manner with appropriate graphics and explanation (Zakariva, 1982, p.19). The type of programming for this type of activity is considerably more difficult. The PLATO system is a good example of this type of instruction. The main objection to this use is that it is still a structured experience which does not allow the student ample freedom to pursue individual interests. In addition the learner has very little manipulative control in this environment.

Computer Managed Instruction (CMI) usually refers to a combination of drill and practice and tutorial activities which are supervised by a management program which is capable of monitoring and recording student progress. Some systems are also able to make decisions regarding which materials should be delivered to the student based on past performance.

Educational games and simulations constitute the last type of CAI. In fact the term CAI does not properly reflect the type of activity which occurs when these types of courseware are used. Computer assisted learning (CAL) is probably a more descriptive term.

Games and Simulations :

Simulations represent " controllable worlds " (Forman, 1983, p.134). It is expected that there will be a move from drill and practice activities towards the tutorial approach by 1985 and then to simulations (Chambers and Bork, 1983, p.120).

Eisele (1979, p.15) describes simulations as:

> the form of presenting a situation to the learner and requiring a response based upon a decision of how to act in that situation with feedback in the form of the likely consequences of having acted in the way decided upon.

They provide an opportunity for the student to relate learning to the real world (Smith, 1982, p.7). Good simulations are usually dynamic, responsive and imitative of real world situations (Kleiman et al, 1981, p.108).

Klassen and Rawitsch (1980, p.83) describe the use of games and simulations as follows:

> Computer simulation provides operating models of a physical or social system, while games are competitive interactions among participants to achieve specified goals. Games, since they involve competition, are often highly motivational for students, especially games which involve competing against the computer. When combined, simulation and games provide a powerful learning tool. In the social studies, simulation and games allow students to explore and discover cause and effect relationships, develop and try out strategies, develop decision making skills and learn how social, economic and political systems operate.

Denton (p.82) groups simulations with game playing and describes these games in various categories. Quest games refer to the fantasy and goal acquisition type of activity. Mental skill games are similar to existing board games such as Mastermind and Othello.

Physical skill games are best represented by the arcade games which are so popular. Simulations may include some or all of these features. Denton makes a minor differentiation when he likens the simulation to an investigative approach to understanding rather than a control or mastery situation.

Noonan (1981, p.132) considers an educational game to be a simulation which has the qualities of a game.

Becker (nd, p.34-35) makes the following observations:

> Simulations --- have an explicit set of rules, participants with explicit amounts and types of resources, and usually, pre-ordained goals and a measure of success in meeting those goals.

Simulations allow the student to take risks and make mistakes without serious and real consequences (Whittredge, 1982, p.7).

The computer's advantage in providing this type of simulated activity is due to its:

> unique ability to manipulate and store large amounts of information (which) makes it possible for students to deal with complex, dynamic issues they might not otherwise encounter in other (non-computer) games and simulations (Whittredge, 1982, p.7).

This type of active learning allows the student to:

> acquire new information, discover general principles, test ideas, and develop thinking and problem-solving skills (Kleiman et al, 1981, p.108).

This problem-solving approach is reinforced by the following statements:

> A computer simulation is a system designed to reproduce essential aspects of reality for the purpose of finding ways to manage, control, solve, and/or ultimately agree upon the best solution for a problem (Noonan, 1981, p.132).
>
> Computer simulations can be rich in problem - solving requirements and opportunities; substantial learning can occur in such a highly motivating environment (Moursand, 1982, p.42).

At the same time, Moursand makes the point that many problems which students are presently exposed to are contrived and silly. One might conclude that there is little motivation for the student to learn under such conditions. Driskell (1984, p.12), when refering to videogames, suggests that the increased motivation of the game environment decreases the gap between the ability and the performance of the student.

Baker (1982, p.28) considers the type of decision making which occurs in a simulated environment to represent the highest level of problem-solving.

Whittredge (1982, p.6) in defending the use of games in the classroom environment makes the following points:

> The acquisition of academic skills is a major component of any successful classroom simulation.
>
> The real challenge for a computer game designer is to create a believable, consistent, interconnected environment that will totally draw in the player. The next step is to make a skill, such as addition, an integral part of that environment.

This type of a structured environment is confirmed by Driskell (1984, p.11) in the following description:

> Videogames consist of rule-governed play to obtain the specified goals, and play involves challenge against uncertain outcomes

The role of play should not be disregarded in learning situations. Norris (1984, p.39) points out that play is "a natural part of our existence" and provides "an important opportunity for learning". The point is also made in the same article that "computer games are ... a viable educational tool for the primary and intermediate classroom" (p.40).

A study conducted by Malone (1981, p.266) identified the three elements of challenge, fantasy and curiousity as being the main characteristics of games. He also differentiated the types of fantasy involved in game playing. Intrinsic fantasies were those in which the "fantasy depends upon the skill" while extrinsic fantasies were situations where "the skill also relies on the fantasy" (p.270). Challenge and curiousity are also depicted as elements of the natural human condition. Using these elements to stimulate learning can, therefore, be seen as a natural and normal process.

A final point regarding model building should be made. All fields of scientific endeavor use this technique for solving problems (Moursand, 1982, p.62). Denenberg (1982, p.82-83) suggests that sophisticated models allow the user to determine the algorithm that is used in the model. LOGO is an example of this type of simulation technique.

The value of simulation and game experiences is illustrated by the following statement:

> The better educational games involve active student participation, group co-operation, logical thinking, various levels of challenges using visual and sound stimulation. Educational game theory is a new frontier that should be explored more and exploited to its full advantage. (Rehak, 1983, p.13)

The field of education should be prepared to make use of any technique which provides a stimulating, exciting environment through which children can learn the skills of thinking, analyzing and problem-solving.

Effectiveness of CAI :

Dence (1980, p.50) points out that the use of CAI will depend largely on the ability to prove effectiveness. To date there are few methodologically sound evaluations and few conclusive results (Forman, 1983, p.129). Some research indicates successful use of drill and practice activities in languages and sciences when the activities provided ample provision for branching (Dence, 1980, p.51). A review of the literature by Forman (1983, p.129) indicates a number of central concepts for which there was some evidence:

1. Learning appeared to be equal to or greater than traditional approaches;
2. The type of CAI or the system used did not appear to make a difference;

3. There were instances where less time was required to learn the same amount of information;
4. Students had a positive attitude towards CAI;
5. Tutorial and drill and practice activities were more effective with low-ability students;
6. Retention rates may be lower.

It is obvious that there is still considerable investigation in this area required. One of the difficulties for evaluation may be in the fact that it is viewed in respect to traditional processes (Garson, 1983, p.120-121).

Simulations prove to be particularly difficult to evaluate in a formal sense. The final outcome of the simulation; observation of the activity of the individual or group; and associated worksheets and flowcharts appear to be possible approaches (Noonan, 1981, p.138). In addition, there seems promise in conducting attitudinal studies related to CAI activities (Forman, 1983, p.128-129). Fisher (1983, p.84), in a recent study, found a positive change in students attitudes in a number of areas including: attendance, motivation, and increased attention span.

Fisher (1983, p.82) also discovered some conditions which seemed to influence the effectiveness of CAI activities:

.When it is aimed at specific student-body groups;
.When it is fully integrated into the regular classroom curriculum;
.When certain subject areas are selected; and
.When the proper setting and scheduling is established.

Although there is an indication that we need more definitive information (Garson, 1983, p.124), the following statement by Denenberg (1982, p.82) will perhaps lend some perspective to this problem:

> If, through games, we are imparting the ability to the student to confront a problem confident that it can be brought under control, then we have no need to make excuses for computer games.

This points out the necessity for schools to provide interesting learning situations (Whittredge, 1982, p.6) and make effective use of the technology.

Social Interaction and CAI :

There is some concern that CAI methods will result in a dehumanizing influence. Skeptics envision schools of the future as containing individual cubicles where students in a lonely environment are fed the appropriate facts at what is determined to be the appropriate time. Garson (1983, p.123) refers to drill and practice activities as being asocial.

This may be true of some types of CAI. However, this is not necessarily the case for simulation activities.

Becker (nd, p.52) points out that:

> Social interaction is by far the most common mode of learning in school, and computer programs could build upon this fact.

This is confirmed by Whittredge (1982, p.6) in the following observation:

> the main thing that almost any observer notices in a class that is running a group-oriented simulation is the high level of excitement generated and the extend (sic) of the communication among the students in each group.

This should indicate that computers used in instructional settings can in fact encourage good social behavior through co-operative problem-solving.

Summary :

Computer technology should be considered as an effective resource available to students and teachers. Fisher (1983, p.84) in reviewing the area of CAI effectiveness states:

> Besides increasing student achievement, it also changes student attitudes and behaviors, apparently in positive ways. Used wisely, it can be a powerful and effective tool to help students gain control of their own education, both in achievement and attitude.

To use this resource effectively, teachers will need to integrate this technology into the everyday classroom activity. It should be looked upon as a powerful tool able to perform tasks which previously were either monotonous or impossible to replicate in the classroom environment.

Unfortunately, at the moment a number of negative factors seem to affect the degree to which the technology will be adopted. Forman (1983, p.133-134) mentions funding, confusing languages and hardware, poor CAI materials, lack of knowledge about CAI and poor attitude among teachers as major concerns.

Technology and software development will solve some of the

problems. Adequate knowledge and training will be needed to address the others.

Garson (1983, p.122) points out that:

> The goal of the computer design, then, is not to figure out how to get the computer to play the role of the teacher, but to have it serve as much as possible as a <u>resource</u> for the student.

Teaching styles may change when the teacher has this resource to draw upon. Becker (nd, p.54) suggests that:

> Computers may be part of a general social tilt away from verbal learning, towards learning through pictorial, graphic and dynamic media.

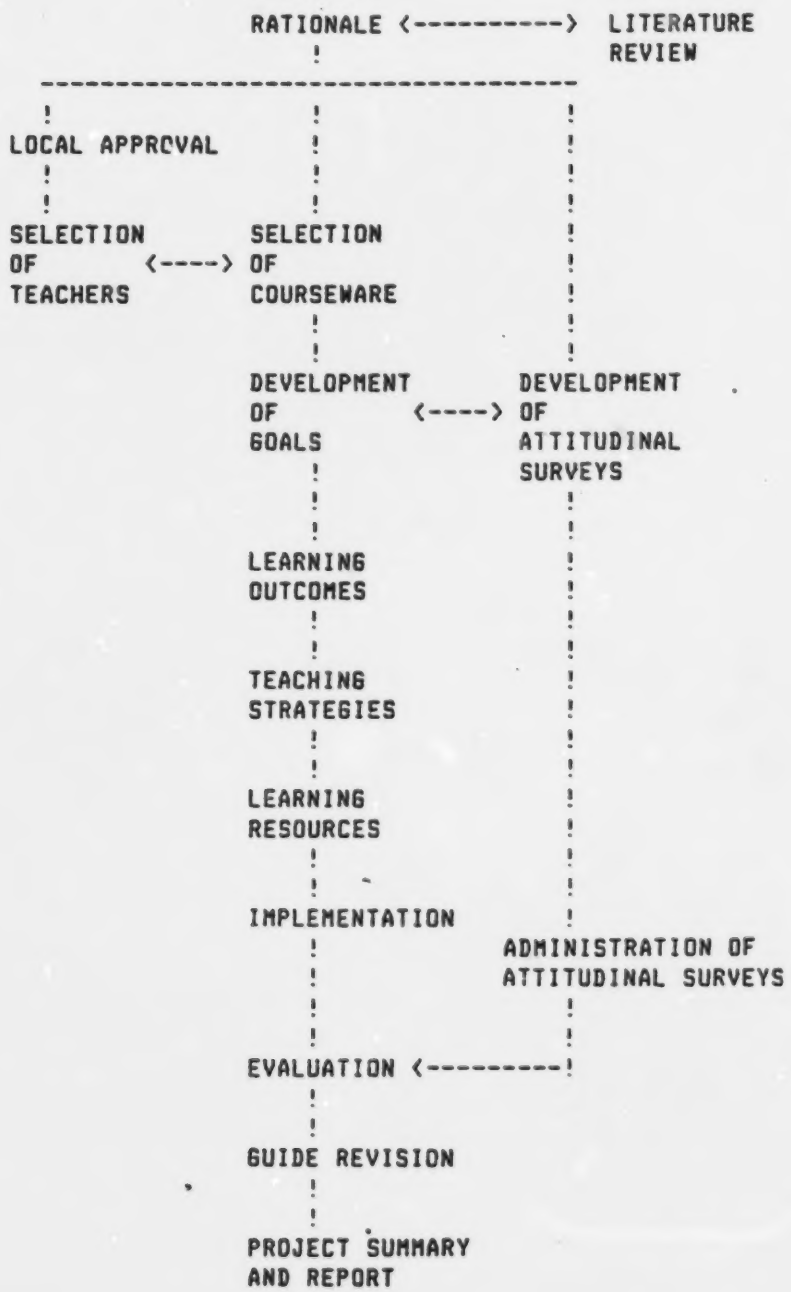
The intent of this research was to provide an introduction to the forms of CAI with particular emphasis in the area of simulations and educational games. In addition the area of effectiveness was considered. The summary is an attempt to make some observations with regard to directions and problems which need to be considered.

Computer technology has much to offer to education. It is up to educators to meet the challenge of this technology and through familiarity learn to adapt and control the technology in order to provide a better learning environment for students. There is little doubt that the technology will develop, whether or not teachers accept the challenge.

PROJECT DESIGN:

The development of this project follows the sequence and organization indicated by the model depicted in Figure 1.

Figure 1
Project Model



Each of the items noted in the model will be discussed in greater detail within specific sections of the project. The following is a brief overview of the organization of the model.

The idea for the project was a result of the researcher's personal observations confirmed by other professionals. In order to define the limits of the study it became necessary to conduct a review of the literature. On this basis the rationale for this project was developed.

Since the study involved students, teachers and parents it was necessary to obtain permission prior to any further action. This permission was obtained from the Superintendent as well as the Principals of two schools.

The selection of teachers and the selection of courseware are shown at the same point chronologically. This was necessary due to the volunteer nature of the project. The researcher did not wish to select courseware which was not suitable to the class situations. For this reason it was necessary to allow for change in both teachers and/or programs.

The development of goals in the instructional setting was considered at the same point as the development of the attitudinal surveys. This was important since the surveys involved the measurement of attitudes related to the courseware being used.

The guides for using the courseware were developed following the sequence indicated. As with the design of most instructional material the process requires reconsideration of the various elements until the material is in its final development stage.

Once completed, the programs with accompanying guides were

implemented by the teachers at the project sites.

At the end of the program the researcher arranged for the administration of the attitudinal surveys.

The evaluation stage involved the examination of the student progress as well as the analysis and interpretation of the results of the attitudinal surveys.

The courseware guides were modified taking into account the information available.

This contents of this project make up the final summary and report.

SELECTION OF COURSEWARE AND PROJECT SITES:

The selection of courseware was influenced by the choice of sites for project implementation.

The first step in this process was to discuss the project with several principals. It was agreed that it would be best to choose locations in which the staff exhibited more than a passing interest in the use of computers. It was not necessary that all teachers be regular computer users. However, a generally positive attitude was seen as being important to the success of the project. Two schools were chosen and the principals suggested names of teachers who would be interested and willing to participate. It should be noted that none of the teachers suggested had a computer in their classroom on an assigned basis. They all borrowed centrally located computers when required.

The project was then discussed with the selected teachers. They expressed definite interest in participating.

The next stage of the process involved the selection of programs appropriate to the ages of the children and the curriculum goals for the grades concerned. The various curriculum guides were reviewed to determine what areas might lend themselves to existing courseware. A review of programs was done based on the curriculum topics. Programs which seemed to be useful were obtained and evaluated using the PEMC Microware Specifications Form which is a slightly modified version of the form contained in the Evaluator's Guide for Microcomputer-Based Instruction Packages (1982). The evaluations for the couseware actually used in this project are included in Appendix E.

This process was lengthly and difficult. Many educators have expressed negative opinions regarding the quality of a great deal of the existing programs. These opinions tended to be valid. Much of the courseware was poorly designed and of questionable value.

The selection of the Hurkle program for the primary students was less difficult. This program has been in use for some time and had proven its usefulness. There were some problems in the mechanics of use as related to the project. The diskette contained a number of other programs which were not a part of the project. In addition, the program contained a section which would likely prove to be too difficult for the students concerned. As a result, the program was modified to avoid these problems.

The selection of the simulation program was considerably more difficult. A number of good simulations were found but it proved

difficult to integrate these with the curriculum goals and classroom needs of the project sites. The recently released Oh, Deer ! program proved to be ideally suited to both the classroom and curriculum needs and the project design.

The Hurkle and Oh, Deer ! programs were discussed with the teachers who agreed with the selection. The next phase was to develop a guide to accompany the programs.

IMPLEMENTATION GUIDE DESIGN:

The term "Implementation Guide" has been used for a specific reason in this instance. The computer programs used were not designed or written by the the author of this project. The teacher materials which accompanied the programs varied in quantity and quality from a few pages in the case of the Hurkle program to a complete manual for the Oh, Deer ! program. Since the project was primarily concerned with the study of attitudes, the purpose for the guides was to provide a framework for the teachers to use in implementing the programs as part of the classroom activities. In addition, the guides were intended to act as a control on the types of experiences the students would have while using the programs.

Since the project involved direct clasroom situations it was considered important that the guides indicate in a formal manner the purposes for using these programs. Also, none of the teachers involved in the project had any extensive background in using computers in the classroom. For these reasons, the guides supplied contained specific details including individual lesson plans.

The guides were reviewed after use. Teacher comments were invited. Student use of the included materials was examined. The guides were revised and are included in Appendix A and Appendix B.

The guides were developed using the following format:

Figure 2
Guide Design

Title of the Courseware
General Description of the Courseware
Grade Level
Reading Level
Goals
    Cognitive
    Affective
Learning Outcomes
Teaching Strategies
Relationship Between Activities, Goals and Learning Outcomes
Courseware Modification (Hurkle Guide only)
Learning Resources
Reference Sources
Lesson Plans

Teachers found the guides to be useful but there was some need for revision. These revisions involved a simplification of some of the introductory material and a sequential organization of the lesson plans. Student materials were modified for ease of use and increased effectiveness. More specific details regarding the guides and accompanying activities are contained in other sections of this project.

PROJECT IMPLEMENTATION:

The project was implemented in the four classrooms during the late Spring of 1984. Teachers were provided with the guides and other required materials.

Since the teachers involved in the project were volunteers, all of the materials were duplicated and where necessary sorted and assembled into the group envelopes. Every attempt was made to reduce the demand on either the teacher or secretarial time at the school level. Accompanying resource material was either duplicated or scheduled for use.

The teachers were not given any detailed instructions since they had some previous knowledge of the program being used. In addition, the teachers all had used computers in their classrooms before and had expressed a commitment to participation in the project.

With the co-operation of a reporter from the local newspaper, articles dealing with the project were run on January 17, 1984 and June 9, 1984.

Workshops were arranged at the project schools during the evening to provide an opportunity for the parents to become acquainted with the goals of the project. The programs used in the project were set up for use by the parents. Unfortunately, these workshops were not well attended.

OBSERVATIONS RELATED TO STUDENT PROGRESS:

Monitoring student progress in a traditional manner when using games and simulations is a difficult task. The game and simulation used in this project are both problem solving and exploratory in nature. Standard measurement instruments (paper and pencil type tests) may not in fact measure actual understanding of the concepts. Examining the progress of the student while actually involved in the activity is likely a better tool for gaining an understanding of the performance of the student. Teachers were asked to evaluate the use of the program and provide indications regarding both student learning and student attitudes. This information is provided in another section of the project.

The actual student record keeping and progress forms were provided to the writer by the teachers. This allowed an opportunity to gain some insight into the type of activity and level of progress by the students.

The game and simulation settings will be reported separately. Where possible indications will be made considering improved or alternate methods for measuring progress.

It should be noted that it is not intended to report individual student scores since the purpose for this portion of the report is limited to observations regarding the actual use of the game or simulation.

The purpose of the project was not to examine the overall performance of the students related to the total unit. Evaluation instruments provided in the guides are intended to examine progress

related to the use of the programs as well as the teaching of other information related to the overall goals for the units. The usefulness of those instruments is commented on by the teachers involved. Modifications to those evaluation tools were made on the basis of the teacher responses.

Primary Students - Game Activity :

The three types of recording forms which were used by each student were examined to discover if the activity of the student tended to move from a random "guessing" approach towards a more rational approach which involved the use of problem solving type skills.

It is worth noting that much of the research seems to indicate the effective means of measuring progress in these types of activities is in fact related to the ability to experience success at using the activity. Other related evaluation type of activities may not in fact test the desired concepts.

The first observation which should be made is that although the teachers indicated high desirability for the use of a paper-oriented activity, the ability of the students to accurately follow the instructions was less than what might be desirable. Some students were very proficient at the task while others tended to forget specific details which made the interpretation of the results more difficult. It also reduced the ability to perform any statistical analysis of the progress.

It should also be noted that although the students had individual record forms, the activity involved three students and therefore reflects to some degree the performance of that group of children and not the specific individual. Teachers did at times change the formation of the groups if there were any types of conflicts with group members which were difficult to resolve.

Each of the students sheets was examined for a pattern of response. Where the students accurately numbered the order of the trials (guesses), it was possible to discover if the trials were random or rational. The result of this exercise showed a definite trend towards proficiency at using a rational approach. Each of the successive trials indicated that the students were moving closer to discovering the correct location within the determined number of tries. Students tended to move from a random pattern with the first exercise to a more structured approach when solving the latter exercises. As a result of this, the success rate for finding the correct location increased.

The skill at solving the problem tended to transfer as the students moved from the horizontal line activity to the vertical line. However, there was a slight regression as students began using the grid activity. At this point the students were required to deal with two dimensions. Once they had managed to develop an understanding of the two dimensional space, and had solved problems related to the input of two numbers separated by a comma, they again tended to use the same type of problem solving skill in this activity.

As was mentioned previously, the recording of this information by the students requires very careful monitoring by the teacher. This tends to be a time consuming activity. The actual exercise may be of benefit to the children. However, examining the forms is a significant undertaking if one wishes to gain useful information.

It is suggested by the writer that the capability of the computer lends itself to a machine-based management and tracking system for the analysis of student progress. The problems related to keeping track of the order of the trials would be solved. It would be fairly simple for the computer to maintain files for each student. These files could contain information relating to the student name, activity number, type of activity, and the success at using the activity. Success could be reasonably easily calculated by assigning a positive or negative value to the trial (guess) depending on whether or not the student response is in the correct direction at each trial. The result of the calculation would indicate a positive or negative value as well as numerical value. The teacher could then examine the student results and have a reasonably clear picture regarding the success that the students were experiencing with the program.

The paper-oriented activities could be maintained if it was felt that there was some purpose to actually performing the exercise. The record forms contained in Appendix A have been modified slightly to enable the teacher to monitor more closely the performance of the students.

The analysis of the record forms proved to be a difficult yet useful activity. The more the students used the program, the more successful they were at locating the correct point. The trials by the students moved from a random to rational pattern indicating the development of problem solving strategies.

Intermediate Students - Simulation Activity :

The report forms used with this activity also reflect the performance of the group rather than individual students.

Three variables related to the report forms were examined:

1. the success the students had at reducing and maintaining the deer population,
2. the public approval rating generated by the simulation,
3. the number of different types of management choices made by the students and the frequency of those choices.

This data reflects the ability of the students to manage the simulation and make appropriate choices based on the current situation.

There were a total of nine groups. The four groups coded AA to AD were the older students. The groups coded BA to BE represent the younger children. The first two columns provide the mean and standard deviation results based on the ending population for a number of simulation trials. The target population is 240 deer. The "choices" column indicates the number of management choices the groups tried when using the simulation. The following two columns provide the mean and standard deviation calculations for the public approval rating. There was no "ideal" public approval rating level.

Table I
Student Progress
Simulation Trials

GROUP	ENDING POPULATION MEAN	S.D.	CHOICES TRIED	PUBLIC APPROVAL MEAN	S.D.
AA	250.4	10.59	5	71.4	2.15
AB	253.4	22.49	5	71.0	3.90
AC	247.2	21.31	4	71.8	1.17
AD	260.4	13.09	5	73.8	3.76
BA	379.3	135.91	4	56.0	10.62
BB	250.3	6.85	5	67.7	6.94
BC	296.7	29.80	4	69.0	3.56
BD	269.0	32.38	5	71.7	2.63
BE	283.0	38.84	6	65.0	6.38

The next table illustrates the percentage use of the various management choices. The results are given for each group as well as the total population.

Table II
Student Management Choices
Simulation Trials

CHOICE	YOUNGER CHILDREN	OLDER CHILDREN	ALL
No Action	10.8	16.0	13.7
Shooting	44.6	66.0	56.6
Trapping	24.3	9.6	16.1
Planting Food	6.8	2.1	4.1
Repellants	2.7	2.1	2.4
Scaring Deer	10.8	4.2	7.1

It is apparent that the students were not making random choices. When the deer population was close to the ideal level, students tended to take either no action or choose those actions which were of a preventative nature. When the deer population was higher than desired the students employed more severe methods of population control. The shooting of deer was used most often at the beginning

levels since this method was the most effective at achieving the desired change. Once the deer population was reduced the students experimented with other methods.

The overall results tend to show that the older students were more successful at accomplishing the objectives of the simulation. This can probably be attributed to a better overall understanding of the various factors involved. In addition, the older students may have been more realistic in choosing the more severe management methods.

Both groups demonstrated the ability to exercise problem solving skills in reaching the objectives. However, the older students were more proficient at the task. Based on this and other observations it is recommended that this simulation be used with children at the grade seven level.

The intermediate teachers also considered the report forms to be useful for monitoring the performance of the groups. It was observed that the students tended to compare and discuss the results. The act of recording of the information did not have any value. It was suggested that the program be modified to incorporate a means of directing the output to the printer.

TEACHER EVALUATIONS OF THE IMPLEMENTATION GUIDE:

The teacher interviews included both an evaluative as well as an attitudinal aspect. Some of the questions have relevance to both areas. However, those questions which dealt primarily with the four main themes identified throughout the surveys have been included in the survey report portion of this project. Those questions which deal with the guide are included in this section.

Primary Teachers :

It has been pointed out in a previous section of the project that the guide which accompanied this program contained very little teacher material. As a result it was necessary to generate a number of activities.

> Did the implementation guide help you in using the program with the children? What would you change?

Both teachers found the guide to be useful. One of the teachers considered it as an introduction and orientation. After that the program was able to look after itself. The other teacher stressed the importance as background for the teacher. Children should not be given programs without the teacher understanding the rationale, goals and purpose. The guide provides the framework for this.

Although the teachers did not report it directly, it was suspected that there was some problem with the overall organization of the guide. The writer felt that the teachers may not have been clear regarding the chronological sequence of the activities.

> How useful were the daily record sheets? What would you change?

The record sheets were viewed as very important. One teacher suggested that without them, very little might have happened. The record sheets provided structure for the children as well as a record keeping function for the teacher. When asked if this function could be handled by a management function within the computer program, the teachers seemed to prefer having the children work with the paper.

One teacher commented that the children had some difficulty in keeping up with the recording on the form related to the grid. It seems that this was a time consuming task.

> How useful were the additional activities? What would you change?

There were three main activities which were separate from the actual operation of the computer program.

STORY : The opinions regarding the story which could be read to the students were entirely opposite. One teacher found it to be interesting and motivating for the students. The story in this case was also used to generate art activities. The other teacher felt it had little value or meaning. Since the opinions varied so much it is likely that this activity should be considered optional.

FILMSTRIP/TAPE SET : Both teachers found the set to be particularly good. The characters and style appealed to the children.

ORIENTEERING WALK : The teachers were relatively neutral about this activity. Both teachers had been planning to do this prior to becoming involved in the project. The students seemed to enjoy the activity but had some difficulty in using the compasses. This activity is recommended if the teacher has had some previous experience.

The use of these activities is not central to the use of the program. Teachers are unique individuals and will select those activities which best reflect the interests and expertise of both themselves and their students. These activities, perhaps with the exception of the multi-media kit, should be considered as optional activities.

> How useful were the evaluation materials? What would you change?

This area seemed to contain the most significant problems. It seems that there may be some difficulty in relating the activities on the computer to paper and pencil evaluation. The closer matching of the evaluation activities to the program is required. Three activities were used:

DIRECTIONS : Students seemed to have a problem with the language phrasing. They confused the words "of" and "from". In many cases their answers were opposite to the required answer. There may be a problem of spatial orientation at this age.

MAZEMAN : This activity proved to be difficult for many of the students. A reduction in the complexity of the maze is required. In addition, starting within the maze would reduce confusion.

PLOTTER : This activity was reasonably successful. Some students tended to reverse the numbers.

As was previously indicated there seems to be some problem in evaluating progress in this program. The most accurate guage of progress is likely the daily record sheets. Additional evaluation instruments should be very simple and require little knowledge transfer to new situations.

Intercediate Ieachers :

The guide supplied with the simulation was considered to be very complete. As a result the specific guide developed for this project used a number of the ideas contained in the supplied guide. However, some additional activities were added. In addition, the background information was developed to fit the B.C. curriculua needs.

> Did the implementation guide help you i using the program with the children? What would you change?

The teachers found the guide useful but faulty. The computer program itself was so well done that little additional information was required.

A couple of significant points were made regarding the structure of the guide. It would have been useful to assign suggested time requirements for each of the activities. Also, it seemed there was some confusion with the way the lessons were organized. It was suggested that the lessons be organized in the sequence of their use rather than by type of activity.

> How useful were the record sheets? What would you change?

Both teachers considered the record sheets to be very important. There was, however, some confusion with the order on the sheet as compared with the order on the screen. The sheet should be changed to reflect the exact order on the screen.

The groups of students used the sheets to compare results and discuss strategies. Brighter students began to see the patterns very quickly and were able to use the results as indicators for future action.

> How useful were the additional activities? What would you change?

There were two additional activities provided for the students.

PUBLIC HEARING : This activity proved to be very well liked by the students. The younger children had some problems in maintaining roles.

MINI-PROJECT : This activity was considered to be well organized due to the use of an outline and the provision of the required resource materials. One teacher pointed out that with reduced resource materials in schools it was becoming increasingly necessary to provide these materials.

It was felt that both of these activities were useful and no changes were required.

> How useful were the evaluation materials? What would you change?

The record sheets should be examined by the teachers to determine the activity and progress of the groups. Since these sheets reflect the total group, an additional evaluation activity (Eco-Quiz) was developed. The teachers felt that the content and vocabulary used was appropriate to the students. Some specific suggestions were made to improve clarity:

1. Use numbers for the matching exercise instead of lines.
2. Indicate the value for each question.
3. Specify how much information is required in the last question.

It is important to note that the simulation program was used in classrooms at two different levels. The curriculum at both levels was suited to the use of this program. However, there was some difficulty with reading skills for the younger group. It is suggested that the program be used at the higher grade level.

ATTITUDINAL SURVEY DESIGN:

The primary references used for the design of the attitudinal surveys were the texts: How to Measure Attitudes (Henerson et al., 1978) and Readings in Attitude Theory and Measurement (ed. Fishbein, 1967).

The purpose of the project was to discover the attitudes held by students, teachers and parents towards the use of computer games and simulations in the primary and elementary classroom environments. Four common themes were investigated in each of the surveys. Additional questions were included where the theme of those questions could be useful as a reference related to the common themes. These additional questions will be discussed in the context of each of the individual surveys.

The following is a brief explanation of the four common themes:

Enjoyment : That children should enjoy playing games and other similar activities seems obvious. However, when the activity has an "educational" function it sometimes seems to affect the perceptions of the activity. The purpose for surveying this topic was to discover if the activity was perceived as enjoyable. In the case of the parents, the questions were phrased to discover if the concept of "enjoyment" of the learning process was important.

Learning Effectiveness : Survey questions were used to determine the perceived effectiveness of these activities as learning tools.

Group Interaction : The activities involved group environments. The skills associated with problem solving are often learned through peer group interaction. Therefore, the writer was interested in discovering if the group was seen as a helpful environment.

Computer/Program Interaction : The question of ability to interact with a computer and computer program is often raised, especially with younger children. Questions were asked to determine if there were any significant problems.

Different survey instruments were used dependent upon the size and age of the respondent population. Samples of the survey instruments are contained in Appendix C.

Primary Students : Due to the young age, an interview technique was used. The interviewer was not known by the students.

However, it appears from the teacher comments that the students considered the experience to be a special treat and they felt important. The interviewer was briefed on techniques and made written notes during the interviews.

Intermediate Students : A simple questionnaire was used at this level. Responses were in three categories. Many of the students had, earlier in the year, participated in a district survey which used the same format. There were open questions at the end to allow for any other responses. The surveys were administered by the writer.

Parent Surveys : A questionnaire was used with the parents. This was taken home and returned by the students. The survey was anonymous. The survey was duplicated on a type of cardstock, which when folded in half took a form much like a "greeting card". The back of the form included questions which the parents were asked to discuss with their children. Included in the survey were questions dealing with the relationship to the child and computer ownership.

Teacher Surveys : The teachers were interviewed individually by the writer. It was felt that there was an honest, professional relationship between the writer and the respondents. The questions in the survey dealt with the previously mentioned themes as well as the evaluation of the overall program.

The surveys were administered at the end of the implementation period.

DATA ANALYSIS PROCEDURES AND RESPONDENT DATA:

The various surveys were collected and analysed by the writer. The response levels to the various surveys are indicated in the following table:

Table III
Survey Response Data

PRIMARY SAMPLE:	Number	%
Total Population	39	100
Students Surveyed	35	90
Homes Surveyed	30	77

INTERMEDIATE SAMPLE:	Number	%
Total Population	51	100
Students Surveyed	49	96
Homes Surveyed	33	65

The analysis procedures will be discussed on the basis of the individual surveys. A detailed summary of the data is contained in Appendix D.

Primary Student Survey :

The responses recorded by the interviewer were analysed on a YES/DON'T-KNOW/NO basis. The responses were then assigned values on a three point scale. A YES response was given a value of 3, a DON'T KNOW response was given a value of 2, and a NO response was given a value of 1. These responses were then analysed and sorted by sex and location using a data management program. From this data, the mean and standard deviation were calculated using a computer-based statistics program.

The verbal comments which were recorded by the interviewer were grouped by theme and sorted in the same manner. These comments are reported later in the report.

Intermediate Student Survey :

The same type of data analysis was performed with this group. In this case the open responses applied to two questions. These were also sorted by sex and location.

Parent Survey :

The parent survey involved a five point scale. A STRONGLY AGREE response was assigned a value of 5, an AGREE response a value of 4, a DON'T KNOW response a value of 3, a DISAGREE response a value of 2, and a STRONGLY DISAGREE response a value of 1. The data was sorted using the data management program into the following categories: location, sex of respondent, sex of child, and computer ownership. The mean and standard deviation were calculated based on the sorted data. Written comments were compiled and are reported in a later section of the project.

The results of the responses to the questions dealing with the sex of the parent, sex of the child, and computer ownership are reported in Appendix D.

Teacher Surveys :

No data analysis was performed due to the small number of respondents. The responses were interpreted and reported in various sections of this project.

It is important to note that with any research the results obtained apply primarily to the situation and population studied. The limitations in this project apply to two main areas:

1. Population: The population for this study represented the students, parents and teachers of four classes. These four classes consisted of a primary and intermediate class from each of two schools.

2. Courseware: The range of experience in the use of games and simulations by the respondents is unknown. Therefore, responses should be considered as applying to the game and simulation which were used in the study.

However, it is hoped that the observations which can be made from the population studied will have some value in the design and use of courseware and in further research.

ANALYSIS AND INTERPRETATION OF STUDENT SURVEY RESULTS:

The primary and intermediate surveys will be dealt with on an individual basis in this section of the report. The overall rating for each survey item is provided in the accompanying tables. A more detailed breakdown of the survey results is provided in Appendix D.

Primary Student Survey :

Four main themes were considered. These themes will be examined individually.

Theme 1: ENJOYMENT

The students had very positive attitudes towards the use of the computer game. Table IV displays the results for the first three questions.

Table IV
Primary Students
Theme: Enjoyment

	MEAN	S.D.
Did you like playing Hurkle ?	3.00	0.00
Was it like a game that you would play for fun?	2.91	0.37
Would you like to use more games like this?	3.00	0.00

An analysis of the open verbal responses recorded at the time of the interview indicates the same type of consistency. The students viewed the game as a fun activity. It was considered to be exciting, challenging, neat, enjoyable, like a guessing game and different from other games. Some students noted that they enjoyed the competition type of aspect. Other students made particular mention of the music and graphics. A couple of students pointed out that it didn't feel like work and that it was better than writing. One student described the game as being better than most video games.

The negative comment when queried indicated a level of frustration when a difficult aspect of the program was encountered. Once conquered the game again became a fun activity.

Theme 2: LEARNING EFFECTIVENESS

The results displayed in Table V indicate a strong perception of the usefulness of this game as a learning tool.

Table V
Primary Students
Theme: Learning Effectiveness

	MEAN	S.D.
Did playing Hurkle teach you anything new?	2.89	0.40
Do you think this is a good way to learn things?	2.97	0.17
Would you like to learn more things this way?	3.00	0.00

Students commented on learning a variety of things from the game. The most common responses indicated the learning of compass directions and grids. A few students noted that they learned strategies and thinking skills. Suggestions for further application in other subject areas were made by one particular student. Some individuals mentioned the learning of skills related to keyboard and computer use. Several comments related to the preference for games instead of other classroom activities. One individual thought that the use of the game would help them in the future in the event that they were ever to become lost. There were no strongly negative feelings.

Theme 3: GROUP INTERACTION

There was a greater variance of response for the questions dealing with this topic as indicated by Table VI. The students generally agreed that they were able to help each other. They also felt that it was better to have the help, but they did not necessarily agree that they liked having the help.

Table VI
Primary Students
Theme: Group Interaction

	MEAN	S.D.
Were you able to help each other to find Hurkle?	2.94	0.33
Did you like having someone else help you find Hurkle?	2.69	0.71
Was it better to have someone helping you to find Hurkle?	2.77	0.59

Students who responded positively to the questions found it was easier to play the game when there were others to help you. One student noted that it was like having a brother or sister helping you. They were willing to note that they needed help as much as they were able to help others. Without the help they may have had difficulty at times. Others noted that it was useful to have other students to act in the record keeping capacity while they were actively involved in playing the game.

Some students were less anxious to have help. They indicated a preference for playing the game on their own, but were willing to request assistance when they were having difficulty.

A small number of students felt that some of the others were just guessing and this annoyed them. These students did not really want to use the game in a group situation.

Theme 4: COMPUTER/PROGRAM INTERACTION

The students seemed to feel comfortable working with the computer. The types of classroom situations did not allow for constant direct supervision so students were required to work out some of the problems on their own. The results of Table VII seem to indicate that students did reasonably well at this task.

Table VII
Primary Students
Theme: Computer/Program Interaction

	MEAN	S.D.
Did you have any problems working with the computer to find Hurkle?	1.29	0.66
Did the pictures and words on the TV help you find Hurkle?	2.91	0.37
Was it difficult to type in what you wanted the computer to do?	1.20	0.52

The number of open responses to these questions were limited. Many students were satisfied to simply give a YES or NO type of answer. The types of responses seemed to be divided into two main areas: program and hardware.

The most common problem seemed to concern the input routine required in the grid portion of the program. Students forgot to enter the comma separating the two numbers.

A few students indicated some problems with remembering to press the return key. Some students also removed the diskette immediately after loading the program. When they attempted to reload the program through the menu screen the computer was unable to do so. They then had to start over again.

A couple of students noted having problems at the beginning but they were able to learn quickly.

Several positive comments were recorded regarding the usefulness of the screen displays.

Theme: OPEN QUESTION

The students were asked how they would describe the program to a friend. The responses were generally very positive. They considered the game to be fun to play, challenging, interesting, and easy to play once they understood how it worked. Some described it as a learning game. There was mention of the different levels of difficulty. They also made reference to the amount of fun it was to play on the computer. Some students described the graphics and sound features. One student suggested that you could start learning before you went to school. Another student said that this sort of thing would help to get a job in the future.

Some General Observations:

Due to the relatively small population and the consistency of responses it is difficult to make any definitive statements about differences between groups within the surveyed population. However, based on the data there were a few tendencies based on both the data and the open verbal responses which may be worth noting:

1. Girls tended to be more positive about the learning effectiveness of the program.
2. Girls seemed to be more likely to note the graphics and sound features.
3. Boys seemed to be slightly more confident about using the computer.

The students involved in the use of this computer game seemed to indicate having had a positive experience. They generally, enjoyed playing the game, felt that they had learned something, agreed that it was useful working in a group, and that they did not have major difficulties using the computer or the program.

Intermediate Student Survey :

The same four themes were investigated with the intermediate level students. At the end of the survey the students were asked to indicate what they liked and did not like about the simulation. The responses to these questions have been noted with the individual themes.

Theme 1: ENJOYMENT

Most students indicated that they had enjoyed using the simulation. The appeal of using simulations decreased with the next two questions as indicated in the following table.

Table VIII
Intermediate Students
Theme: Enjoyment

	MEAN	S.D.
Did you like using the simulation?	2.78	0.51
Would you like to use more simulations in your class work?	2.57	0.70
Was the simulation something you would do for fun in your spare time?	2.16	0.89

Many students indicated that they liked everything about the program. Others liked the idea of making choices and being able to try different methods. They described the program as being fun, interesting and enjoyable. The graphics features of the program were also mentioned. The idea of hunting appealed to one of the students. A few individuals considered using the program as an opportunity to use the computer.

The negative opinions about the program seemed to deal primarily with the repetitive nature of some of the routines. The program for these individuals became boring and monotonous. A couple of students pointed out that they did not like having to shoot or trap the deer. They would rather have kept the deer as pets.

Theme 2: LEARNING EFFECTIVENESS

Students generally seemed to agree that they had learned something from using the program. They also felt that simulations were a good way to learn. However, there was a greater range of opinion

regarding whether or not they would like to learn more things through using simulations.

Table II
Intermediate Students
Theme: Learning Effectiveness

	MEAN	S.D.
Did the simulation teach you anything new?	2.67	0.65
Do you think simulations are a good way to learn?	2.63	0.60
Would you like to learn more things using simulations?	2.43	0.76

Students mentioned the aspect of decision making. They liked the different points of view expressed and the opportunity to participate and learn from role playing. They also mentioned the group work and the need to co-operate.

A small number of students indicated that they had not learned anything new or important from the program and that the program took too much time.

Theme: GROUP INTERACTION

This area was the one in which there were less positive opinions and a wider variation of response. Although students may have felt that it was better and more helpful to work with others, they did not necessarily like having to do so.

Table X
Intermediate Students
Theme: Group Interaction

	MEAN	S.D.
Did it help to work with others in a group?	2.29	0.81
Did you like having someone work with you during the simulation?	2.14	0.88
Was it better to work with others when using this program?	2.31	0.86

A few of the students made positive reference to the group work in the open questions. However, the aspect of group work appeared more often as a negative comment. They noted that the groups were too large and that there were a number of arguments. Some people took over the group while others were not willing to experiment. It appears that some of the students would have chosen to have used the simulation on their own.

Theme: COMPUTER/PROGRAM INTERACTION

Students seemed to feel confident and competent about using the computer to run the simulation. The screen displays and instructions were viewed as informative and helpful.

Table XI
Intermediate Students
Theme: Computer/ Program Interaction

	MEAN	S.D.
Did you have any problems following the simulation instructions?	1.23	0.55
Did you have any difficulty understanding the information on the screen?	1.16	0.51
Did you have any problems giving instructions to the computer?	1.27	0.63

Several students commented on the graphics used in the program as well as the detailed background information which was available through the use of help screens. They also liked the public opinion and population displays. A few students mentioned that they liked working on the computer.

One student noted difficulty with finding the computer keys. Another student indicated a dislike for the public opinion display. A few comments were made about the repetitive nature of some of the routines especially the permit procedures. One student noted that it would have been useful if the student choices could be sent to a printer.

General Observations:

Due to the small population it is difficult to make any definitive statements about differences between groups within the surveyed population. However, there were some minor differences which may be worth noting:

1. Girls seemed to enjoy using the simulation more than the boys. There was less variance in the responses.
2. Boys tended to be more positive about using this simulation as a learning tool. They also felt more strongly about using more simulations.
3. The younger group within the population had a more positive attitude toward using the simulation. They also felt that they learned more.
4. The older group had a more positive attitude towards using simulations as a learning tool.
5. None of the groups seemed to have any more difficuly in using the computer or program.

The students involved in the use of the simulation seemed to indicate having had a positive experience. There were no major difficulties in using the computer or the program. The major area of variance seems to be in the use of groups. Students seemed to realize the value of working in a group but were less convinced about how successfully they were able to work together. This may have been a reflection of the size of the groups.

ANALYSIS AND INTERPRETATION OF PARENT SURVEY RESULTS:

The primary and intermediate parent survey results will be reported on a thematic basis in this portion of the report. However, the comments dealing with each theme will be considered collectively since there was a general consensus of opinion across the parent population. There was not a major difference in attitude when comparing games and simulations. A detailed breakdown of survey results is provided in Appendix D.

Theme 1: COMPUTERS AND EDUCATION

The questions asked in this portion of the surveys were designed to determine an overall measure of attitude towards computers and their use in the educational setting. Parent responses were generally very positive.

Table XII
Primary Parents
Theme: Computers and Education

	MEAN	S.D.
Computers should be used in education as learning tools.	4.33	0.65
The ability to use computers is an important skill for children to learn for the future.	4.60	0.50

Table XIII
Intermediate Parents
Theme: Computers and Education

Computers should be used in education as learning tools.	4.55	0.50
The ability to use computers is an important skill for children to learn for the future.	4.70	0.46

There was some range of opinion. One parent strongly urged the introduction of computers at the primary level. The same parent suggested that perhaps computers should replace some teachers and save taxpayer money. This extreme position was balanced by other parents who expressed concern that the basic student - teacher relationship should not be affected.

One parent expressed a dislike for computers and stated that they had no intention of ever owning any computerized devices. Another parent felt that there was probably enough emphasis already. There was some concern that other programs such as music and art would suffer.

However, most parents felt that the world was moving quickly into the use of the computer and it was important for children to learn to use computers in school.

There was a slight tendency for parents of intermediate level children to feel more strongly about these questions.

Theme 2: COMPUTER GAMES/SIMULATIONS AND EDUCATION

The next set of questions attempted to discover if the feelings held about computers in general were carried through into the use of games and simulations.

Table XIV
Primary Parents
Theme: Computer Games and Education

	MEAN	S.D.
Computer games can be used as learning tools.	4.23	0.42
Schools should make more use of computer games for learning.	4.10	0.70

Table XV
Intermediate Parents
Theme: Computer Simulations and Education

	MEAN	S.D.
Computer simulations can be used as learning tools.	4.29	0.45
Schools should make more use of computer simulations as learning tools.	4.00	0.89

The parents seemed to recognize that these types of programs could be useful as learning tools. However, they were not willing to strongly urge their more frequent use. It might be suggested that the parents are looking for more information before passing further judgement. One parent took the time to suggest that there was a general lack of knowledge about programs. As a result it was difficult

to assess the situation.

A few parents noted that their children had enjoyed using the simulation and seemed to have learned from the experience.

Theme 3: ENJOYMENT OF LEARNING

The use of computer games and simulations is often considered to be a play type of activity. The next two questions were an attempt to assess how parents felt about the enjoyment of learning and the role of computer games and simulations in increasing this enjoyment.

Table XVI
Primary Parents
Theme: Enjoyment Of Learning

	MEAN	S.D.
Enjoyment of learning is important.	4.77	0.43
Computer games can increase the enjoyment of learning.	4.23	0.67

Table XVII
Intermediate Parents
Theme: Enjoyment of Learning

	MEAN	S.D.
Enjoyment of learning is important.	4.79	0.41
Computer simulations can increase the enjoyment of learning.	4.24	0.65

The results were most interesting. There was a significant similarity between the feelings of primary and intermediate parents.

It was promising to note that the parents felt very strongly about their children enjoying learning. Some of this feeling although in a lesser degree was apparent in their responses regarding the use of computer games and simulations.

Several parents mentioned that their child had enjoyed using the program.

Theme 4: ABILITY TO USE COMPUTER GAMES/SIMULATIONS

The use of computers in the elementary school, especially in the primary grades, is sometimes questioned. The results from the following survey questions seem to indicate that this concern does exist.

Table XVIII
Primary Parents
Theme: Ability to Use Computer Games

	MEAN	S.D.
Primary children are capable of using computer games for learning.	4.10	0.70
Primary children should make greater use of computer games for learning.	3.80	0.91

Table XIX
Intermediate Parents
Theme: Ability to Use Computer Simulations

	MEAN	S.D.
Elementary children are capable of using computer simulations as learning tools.	4.27	0.57
Elementary children should make greater use of computer simulations for learning.	3.97	0.87

The parents of intermediate level children seemed to be more positive about the ability of their children to use the simulations. Primary parents were more cautious and there was more variance of opinion. In both cases there was caution expressed about the increased use of these types of programs.

There was some concern that the computer was like the television and that although the children may enjoy the experience, there may be little learning actually taking place. Again, it seems that it is important to gain a deeper understanding of the effectiveness of these types of programs. This information must then be conveyed to parents.

Theme 5: COMPUTERS AND GROUP ACTIVITIES

Many people consider that the use of computers is primarily in an individual situation with one student assigned to a computer. Some of the research seems to indicate that this is not necessarily the

most common or desirable model. Both of the programs used were implemented in such a way that group interaction was necessary and important. Parents were asked how they felt about the group interaction environment.

Table XX
Primary Parents
Theme: Computers and Group Activities

	MEAN	S.D.
Students working in groups at a computer can learn from each other.	4.17	0.97
Allowing children to work together at computer games should be encouraged.	4.07	0.85

Table XXI
Intermediate Parents
Theme: Computers and Group Activities

	MEAN	S.D.
Students working in groups at a computer can learn from each other.	4.18	0.63
Allowing children to work together at computer simulations should be encouraged.	4.06	0.65

It is interesting to note that the mean scores for the primary and intermediate parents were very close. However, there was a much greater range of opinion in the case of the primary parents.

A number of parents commented that group interaction was acceptable for recreation, but education and learning are individual

experiences. Some parents noted that there was a tendency for some children to be aggressive causing other children to be less active. It was suggested that at the intermediate level the groups were too large and that three students would have been a more reasonable size.

A couple of parents indicated that there children had enjoyed the group activity. One individual expressed particular interest in the idea of group dynamics in the decision making process.

General Observations:

Due to the small population it is difficult to make any definitive statements about differences between groups within the surveyed population. However, there were some differences which may be worth noting:

1. Parents who either owned or had plans to buy computers were generally more positive about most of the survey questions. Further study to discover the basis for this difference would be useful.
2. Fathers tended to respond more positively than mothers to most questions. However, caution in drawing any conclusions should be observed since the number of fathers who responded were relatively few.
3. There was a tendency for parents at one of the locations to place a higher value on computer related activities. The

reason for this is not clear. Perhaps, the difference is related to the socio-economic background, the involvement in and knowledge about the school program, or other unknown factors.

4. At the intermediate level there was a tendency for parents to view the computer simulations as being more beneficial for boys than for girls. This same tendency in relation to games did not apply at the primary level.

Parents generally considered the knowledge about and the use of computers to be important to the school program. They were very aware of the increasing use of computers in the world and the fact that this is a skill which their children will require in the future.

There was also a strong indication that education should be an enjoyable experience.

Attitudes towards the use of computer games and simulations were also positive although somewhat less in magnitude. This may be a result of a lack of knowledge about the content and goals of these types of programs.

Parents were also positive yet concerned about the use of groups in the classroom environment when computers were being used. The whole area of peer learning in this environment requires investigation.

ANALYSIS AND INTERPRETATION OF TEACHER SURVEY RESULTS:

Only four teachers were involved in this study. For this reason the results of those portions of the teacher interviews which deal with attitudes will be considered collectively. Where necessary specific reference to primary or intermediate levels will be made.

Some of the questions in the original interviews dealt with program evaluation. The responses to these questions have been considered in another portion of the study.

The responses will be dealt with in the same type of thematic approach which has been used with the student and parent surveys.

Theme 1: ENJOYMENT

The intended goals for each program included the fostering of a positive attitude towards the use of games and simulations. The teachers were the individuals who had an opportunity to observe the students on an ongoing basis.

> Did the students enjoy playing the Hurkle game/ Oh, Deer ! simulation? How could you tell?

All of the teachers responded positively. They noted that students were keen to go when it was their turn and disappointed if for any reason the computer was not available at their scheduled time. Intermediate teachers noted that there was a lot of discussion between groups of students to discover respective levels of public approval

regarding actions chosen during the program.

In the case of the intermediate students there was a tendency for a minority of the students to watch rather than become directly involved.

Theme 2: LEARNING EFFECTIVENESS

A conscious attempt was made to find programs which were suited to both the children and the existing classroom program.

> Do you feel that this was an effective learning tool considering the age of the children and the curriculum goals for this grade? Please explain.

The primary teachers indicated that the game used was well suited to both age and program. Both mapping and graph skills are indicated within the curriculum guides for this grade level.

The intermediate teachers were slightly divided on this question. In both of the classes the curriculum units studied this year incorporated the goals of the simulation program. The themes of ecology, environment, life cycles and problem solving were all relevant.

However, there was some division of opinion regarding suitability for the age of the children. The two classes were separated by two years. The original guide supplied for the program indicated that the material was intended to cover both grade levels.

However, it was discovered that due to weaker reading skills it was more difficult for the lower grade level.

> On a scale from 1 (low) to 10 (high), how would you rate this program on the basis of overall usefulness as a classroom activity for the students? Please explain.

The primary teachers definitely felt that they would use the program again. One teacher gave the program a rating of 8 out of 10. The same teacher also noted that the program would best be used in a maximum 3 week period with the teacher doing more class teaching along with the group activity. The other teacher gave the program a rating of 9 if the computer was located in the classroom. If not, the rating was 7. One of the problems seemed to be in the evaluation area. The teacher felt she would have a better idea of the progress of the students with the computer in the classroom.

The intermediate teachers were also slightly divided when responding to this question. One teacher assigned a rating of 10 out of 10. It was noted that the program was of very high interest to the students. It was very close to real life and addressed problem solving skills. The other teacher assigned a dual rating to the program. It was felt that the computer simulation without supplemental materials rated a 6.5. However, with the materials supplied in the guide the rating changed to 9 out of 10. This teacher felt that the structure provided by the guide was necessary for effective use.

Theme 3: GROUP INTERACTION

Both of the programs were designed to use groups for the development and sharing of problem solving strategies. The primary game program was designed to use groups of three students. The intermediate simulation program used larger groups of five to six students because of the role model requirements which were a part of the problem solving strategy.

> Was it beneficial for the students to work in groups? Were there any problems associated with the group work? Please explain.

Both primary teachers felt strongly that this was a desirable situation. They agreed that three was an ideal number and indicated that the third person acted as a safety factor which avoided some problems including the isolation of a particular member of the group. It should be noted that all of the students had a specific role which made it difficult to remain an observer. The children tended to sound out each other illustrating co-operative problem solving. It was noted that it was good for the children to work out social problems. In the event of any major problem the teacher would adjust the groups. The amount of flexibility required would depend on the individual classroom.

Both the intermediate teachers were positive about the use of the groups. They felt that it fostered good discussions and the benefits outweighed the few problems. However, it was noted that they

groups tended to be too large. Some students tended to lose interest because of the size of the group.

Theme 4: COMPUTER/PROGRAM INTERACTION

Since this activity was group oriented it was difficult for the teacher to be actively involved in the normal use of the computer and program. Therefore, it is important that the program and computer are easy for the students to use.

> Did the students experience any difficulty working with the computer or the actual game/simulation program? If so, please explain.

The primary teachers indicated that the actual mechanics of working with the computer and the program did not seem to be a problem. The diskette had been modified to limit the students to only those parts of the diskette which applied to this instructional program. This was seen as a desirable situation which should be available on more educational programs. It was noted by one of the teachers that the transition from the vertical and horizontal number lines to the grid proved to be difficult.

The intermediate teachers felt that there were no problems with the use of either the program or the computer. The graphics and instructions were good. A degree of repetition within the program was identified. It was felt that some of this could be eliminated to improve the program.

Theme 5: PARTICIPATION IN CURRICULUM TESTING

All of the teachers involved in this project were volunteers. A lot of work was done prior to the introduction in the classroom. The researcher felt that these teachers were already busy and it was important to prepare as much of the material ahead of time to avoid an extra load on the teachers. Nevertheless, co-operation in a project such as this does require additional effort. It was decided to discover how the teachers involved felt about the additional work.

> Based on your experiences with this project, would you consider working on other similar projects with your class? Please explain.

Teachers expressed a clear desire to be a part of the development and testing process. They viewed the computer as having a great potential for use in the classroom setting. The programs used were viewed as motivating and provided a change from the traditional methods.

The teachers also noted that there is a general lack of information about computers and programs. As a result it seems there are few useful programs available.

General Observations:

Teachers were generally very positive about the use of the programs. They had several useful suggestions to make regarding improvements to both the program and the guide. This type of professional attitude will provide the basis for more effective use of computers in the educational process.

IMPLICATIONS FOR TEACHING AND SCHOOL PRACTICE:

The purpose for conducting a study such as this is to gather information which may be of use to those involved in the educational process. It is important to note that this study involved the use of only two courseware packages. In addition, the population sample was small.

Nevertheless, it is possible to make some observations which may be useful to those involved in the design and implementation of computer games and simulations for the classroom environment. These observations will be divided into a number of categories.

Courseware Design :

The design of programs should take into consideration the research which has been conducted in the area of game theory as applied to the computer. The children, when describing their experiences, used descriptive terms which may be found in this area of research. The use of quality sound and graphics was also noted by the children. All of these factors provide a motivation which should not

be ignored in the design of programs.

The provision of other related materials is important. The guides accompanying the programs should indicate clearly the goals and learning outcomes. Teachers expressed a desire to integrate the use of computer programs with other types of classroom activities. Where possible, the guides should contain a number of these activities which teachers can then choose from based on the needs of their students.

Teacher control of access to program segments was seen as desirable in some cases. A routine should be included with the program which would allow the teacher to define the limits of access for their particular students.

Teacher Education :

Teachers involved in this study considered it to be a positive experience. There should be opportunities available for teachers to become involved in the process of courseware design. Some of the programs currently available have potential for use in the classroom. Teachers, through curriculum development committees, could design implementation packages to accompany these programs. These packages could be shared and exchanged through current resource networks. Opportunities for professional development could also evolve through the provision of in-service opportunities by teachers who have either participated in the curriculum development activities or are active users of the developed courseware.

Evaluation :

Evaluation tends to be more difficult when using games and simulations. The use of conventional evaluation instruments may not prove to be effective or valid. Program designers should take this into consideration. Where possible, the recording of student progress should be a function of the program itself. The output from this could be sent to a printer and evaluated by the teacher as required.

Justification for the Use of Computer Games and Simulations :

Students and teachers both felt that learning had taken place through using the simulations. Parents agreed that learning could occur. However, there was some reluctance to encourage increased use.

It seems reasonable to suggest that teachers and schools should provide opportunities for parents to become more aware of the use and potential of these types of activites. Due to the increasing number of computers in the home environment it may be useful for schools to either loan software to students or to develop lists of recommended programs for the parents. Greater communication between the school and home needs to be encouraged to foster positive attitudes towards the use of these types of programs.

Peer Group Learning :

Most educators would agree that peer group learning has much to offer and may be one of the more effective modes of learning. The teachers involved in this study tended to agree. Students also agreed that at times it was better to have someone helping while doing the programs. However, parents were more divided on this issue. If group

learning opportunities are to be employed, teachers should be well informed in this area and structure experiences which will minimize negative factors which could occur. Parents could be asked to observe or assist in classroom activities in order to develop a greater understanding of the benefits. Group sizes should be structured to fit the activities.

In the case of this study, teachers indicated that an ideal group consists of three students. When each group member has an assigned role, there is less tendency for individual group members to withdraw from the activities.

Student Ability to Operate Computers and Use Computer Programs :

The study tended to point out that students generally had very few problems in operating the equipment or understanding the use of the programs. The equipment proved to be reliable. The programs were generally well organized and provided clear instructions to students. The successful use of programs seems to be related to good design features.

Equipment Availablity :

The study used computers that were located in individual classrooms as well as computers located in central locations in the school. Although both settings worked, teachers expressed a need for machines in classrooms. The teacher would then be available to assist when required and to observe and evaluate the progress of the students. The successful use of computers in schools will be greatly dependent upon the adequate availability of computer equipment.

Computers programs, and in particular games and simulations, have considerable potential for use in the learning environment. Further research will prove useful in refining knowledge related to the use of these types of activities. However, successful use will depend on the use by teachers of sound judgement in selecting and integrating activities which will meet the needs of students.

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APPENDIX A: Hurkle GUIDE

TEACHER'S GUIDE:

TITLE OF COURSEWARE : Hurkle
Elementary Mathematics - MM-1
MECC Vol. 1, Ver 3.4

GENERAL DESCRIPTION OF THE COURSEWARE :

Hurkle is a furry animal which hides on vertical and horizontal number lines as well as two types of grids. The number lines and grids contain compass direction indicators which are used to provide clues as to the location of Hurkle. The activity is designed in a game format.

GRADE LEVEL :

Elementary, Grades 2-6. The grade level noted is that provided by the producer of the program. This guide is designed for use at the Grade 2-3 level.

READING LEVEL : Grade 2.2 (Spache) as reported by the producer.

GOALS :

The goals listed below relate to the goals listed in a variety of B.C. Curriculum Guides. Those selected from the guides have been modified where necessary to reflect the goals of this program. It is intended that Hurkle is an activity which meets the goals in a number of subject areas and is useful as an integrative activity.

Cognitive Goals :

A. Students will understand basic concepts of direction.
B. Students will understand place location using co-ordinates.
C. Students will develop skills in the following areas:
   - Observation
   - Critical Thinking
   - Problem Solving
   - Decision-Making

Affective Goals :

D. Students will become aware of the value of co-operative behavior.
E. Students will view computer games as a means of learning and practicing new knowledge.

LEARNING OUTCOMES :

1. Students should be able to use cardinal and intermediate directions e.g. NE, SW, in locating Hurkle. They shoulld be able to relate this knowledge to the use of a compass in the classroom and school.

2. Students should be able to identify the points on a 10x10 co-ordinate graph. They should be able to relate this knowledge to locating points on a map.

3. Students should develop strategies which would enable them to find Hurkle within the assigned number of turns.

4. Students should be able to take on roles as players, recorders and helpers as they work in groups.

5. Students should demonstrate an enthusiasm for using the Hurkle program.

TEACHING STRATEGIES :

The unit should be presented as a combination of class and small group activities. The class lessons serve to introduce the unit as well as new concepts and vocabulary. The small group activities allow the students to practice and reinforce the concepts through playing the Hurkle game. It is intended that these small group activities be set up in a learning station environment where groups of students would work in assigned or allotted times.

RELATIONSHIP BETWEEN ACTIVITIES AND GOALS AND LEARNING OUTCOMES :

This chart lists the chronological order of the activities for this unit. The related goals and learning outcomes are noted for each activity. The preface "C" refers to a class lesson, "G" refers to a group activity, and "E" refers to an evaluation activity.

ACTIVITY	GOALS	LEARNING OUTCOMES
C-1 Introduction (story and discussion)	Activity is motivational.	
C-2 Cardinal Points & Apple Demo	A,B	1,2
G-1 Hurkle - Horizontal	All	All
G-2 Hurkle - Vertical	All	All
E-1 Mazeman	A,B,C	1,2
C-3 Intermediate Points	A,B	1,2
G-3 Hurkle - Grid	All	All
E-2 Plotter	A,B,C	1,2
C-4 Classwalk	A,C	1,4

COURSEWARE MODIFICATION :

The MECC programs are sold with permission to copy and/or modify within the district. Because of the difficulty in the fourth level of the program, that choice has been deleted from the menu. In addition, the diskette contains a number of other programs. The modifications bypass the main menu providing the students with the Hurkle program only. Directions for modifying the diskette are included at the end of the guide.

LESSON PLANS :

The lessons are provided in a sequential pattern following the introductory pages.

LEARNING RESOURCES :

The following learning resources are specified within this guide:

Elementary Mathematics - MM-1 . Volume 1, Version 3.4, Minnesota Educational Computer Consortium, n.d. (diskette & manual)

Map & Globe Skills . Society for Visual Education, 1976. (filmstrips & cassettes)

Sturgeon, Theodore. "The Hurkle is a Happy Beast," in Jane Zolen (Ed.), Zoo 2000 . Seabury Press, 1973.

REFERENCE SOURCES :

A number of curriculum documents have been used in the preparation of this guide. These sources are listed below:

Elementary Science Curriculum Guide . Victoria, Ministry of Education, 1981.

Mathematics Curriculum Guide: Years One to Twelve . Victoria: Ministry of Education, 1978.

Social Studies Curriculum Guide: Grade One to Grade Seven . Victoria: Ministry of Education, 1983.

LESSON PLANS :

CLASS ACTIVITY/C-1

TITLE OF LESSON: Introduction : Story & Discussion

GOALS: Motivational

LEARNING OUTCOMES: Motivational

DESCRIPTION:

This lesson is an opportunity to read the story which describes the character Hurkle.

Students should be encouraged to talk about the character and his environment.

The students may wish to draw pictures or make their own Hurkle characters out of cardboard.

TIME: Approximately 1 hour with integration of art activities.

REQUIRED MATERIALS:

Sturgeon, Theodore. "The Hurkle is a Happy Beast."

NOTES:

This activity is purely motivational in character.

CLASS ACTIVITY/C-2

TITLE OF LESSON: Cardinal Points & Apple Demonstration

GOALS: A,B

LEARNING OUTCOMES: 1,2

DESCRIPTION:

The filmstrip/tape which deals with cardinal compass points should be shown during this lesson.

The cardinal points should be discussed and illustrated on the blackboard or overhead.

A simple exercise game such as "Simon Says" might also be used to reinforce the directions.

The students should then be shown the operation of the computer which should be set up as a learning station. Because the program is self-booting the students only need to insert the diskette and turn on the computer and monitor. They should be shown that there are several choices. However, the worksheets indicate which choice they should make. Use of these worksheets should be explained carefully. The first two worksheets will be used before the next class lesson.

TIME: Approximately one hour.

REQUIRED MATERIALS:

Filmstrip "Cardinal Points"

NOTES:

This lesson should prepare the students for the horizontal and vertical Hurkle activities which they will work on in small groups of 3 students. It is very important that the students understand the use of the forms. It may be useful to make transparencies of the forms for illustration on an overhead.

GROUP ACTIVITY GUIDE/G-1

TITLE OF ACTIVITY: Hurkle - Horizontal

GOALS: All

LEARNING OUTCOMES: All

DESCRIPTION:

This is the first of the small group activities. Students should use this learning station at the teacher's direction. To use the station they will form a group of three and request permission to use the station. They should then get the required forms from their individual envelopes.

The students should rotate tasks at the computer. The roles should have been discussed in the last class lesson.

Each student should take two trials before beginning to use the record form. The students should not complete more than one form at each session. They should note the day on the form as well as the required names.

The students should be encouraged, if necessary, to discuss strategies for locating Hurkle within the required number of turns.

After the activity the students should return their forms to their individual envelope.

Two forms should be completed before moving on to the next activity.

TIME: Each group should take approximately 20 minutes.

REQUIRED MATERIALS:

Apple Computer
Hurkle Diskette
Form 1 - Hurkle Horizontal

NOTES:

The record forms must be ready in the envelopes and the day and date should be noted on the blackboard. It is preferable to check the forms for completeness when they are returned.

RECORD FORM 1: Hurkle - Horizontal Line

```
-!--!--!--!--!--!--!--!--!--!--!-
 0  1  2  3  4  5  6  7  8  9  10
WEST                        EAST
```

Guess # 1 __
Guess # 2 __
Guess # 3 __
Guess # 4 __
Hurkle at __

Put an X at each point that you guess. If you find Hurkle put a circle.

```
-!--!--!--!--!--!--!--!--!--!--!-
 0  1  2  3  4  5  6  7  8  9  10
WEST                        EAST
```

Guess # 1 __
Guess # 2 __
Guess # 3 __
Guess # 4 __
Hurkle at __

Put an X at each point that you guess. If you find Hurkle put a circle.

```
-!--!--!--!--!--!--!--!--!--!--!-
 0  1  2  3  4  5  6  7  8  9  10
WEST                        EAST
```

Guess # 1 __
Guess # 2 __
Guess # 3 __
Guess # 4 __
Hurkle at __

Put an X at each point that you guess. If you find Hurkle put a circle.

```
-!--!--!--!--!--!--!--!--!--!--!-
 0  1  2  3  4  5  6  7  8  9  10
WEST                        EAST
```

Guess # 1 __
Guess # 2 __
Guess # 3 __
Guess # 4 __
Hurkle at __

Put an X at each point that you guess. If you find Hurkle put a circle.

STUDENT: RECORDER: HELPER:

DAY:

GROUP ACTIVITY/G-2

TITLE OF ACTIVITY: Hurkle - Vertical

GOALS: All

LEARNING OUTCOMES: All

DESCRIPTION:

This activity is very similar to the previous activity. Students should have completed two of the Form 1 - Hurkle Horizontal before beginning this activity.

Students should have two trials before beginning to use the record form. The roles are shared as in the previous activity.

There are two forms to be completed on two different occasions.

TIME: Each group should take approximately 20 minutes.

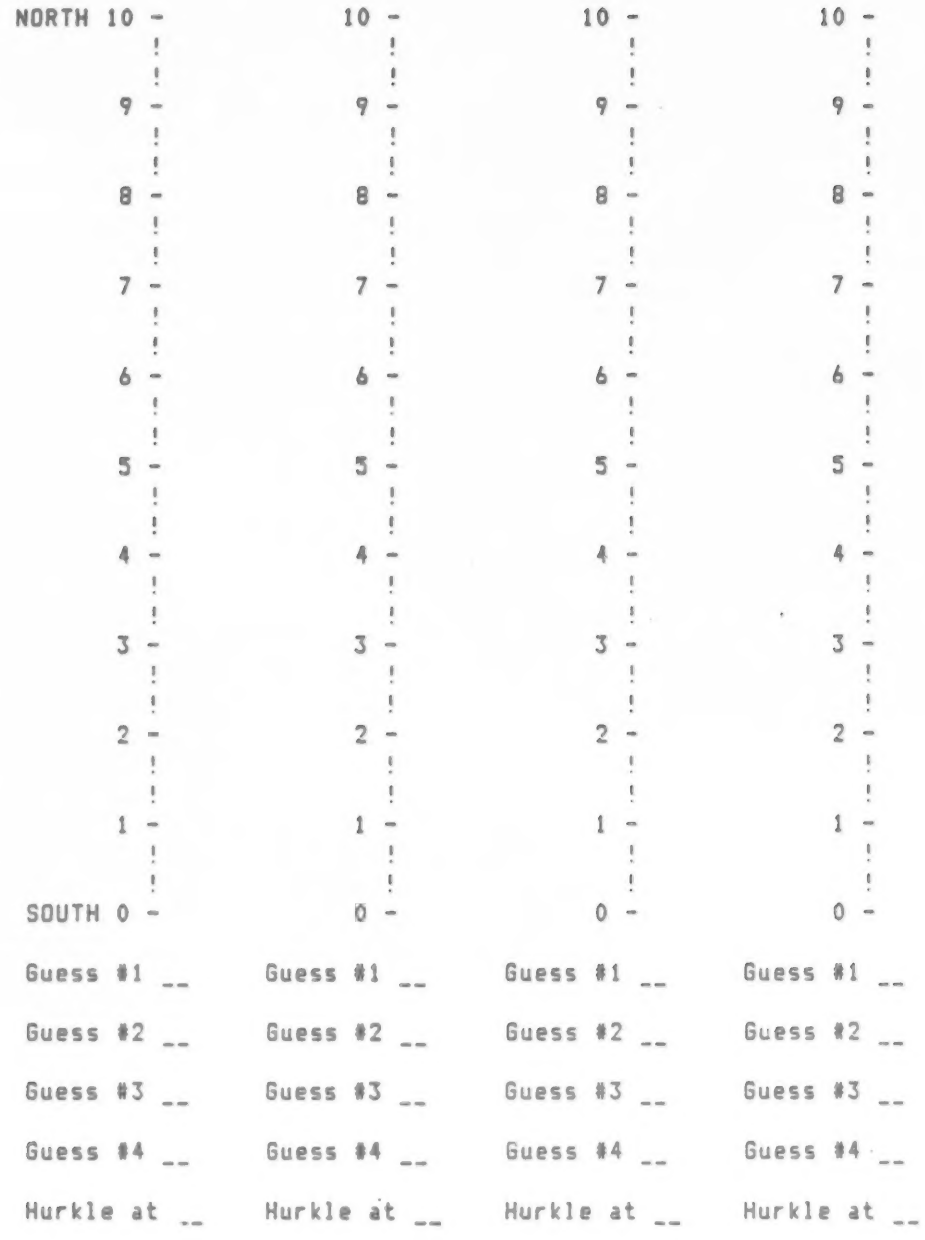
REQUIRED MATERIALS:

Apple Computer
Hurkle Diskette
Form 2 - Hurkle Vertical

NOTES:

The work of the students should be checked when handed in. The class record form can be used to track the progress of the class. No mark is required on the record form. These forms will be checked at a later date for progress.

RECORD FORM 2: Hurkle - Vertical Line



Put an X at each point that you guess. If you find Hurkle put a circle.

STUDENT: RECORDER: HELPER:

DAY:

EVALUATION ACTIVITY/E-1

TITLE OF EVALUATION ACTIVITY: Mazeman

GOALS: A,B,C

LEARNING OUTCOMES: 1,2

DESCRIPTION:

The quiz contains a simple example at the beginning to illustrate the type of solution. This solution could be discussed with the class by using a transparency prior to doing the quiz.

The quiz should be administered to the whole class at the same time and may be reviewed with the class after being corrected. The review should be done using a transparency.

TIME: Approximately 30 minutes.

REQUIRED MATERIALS:

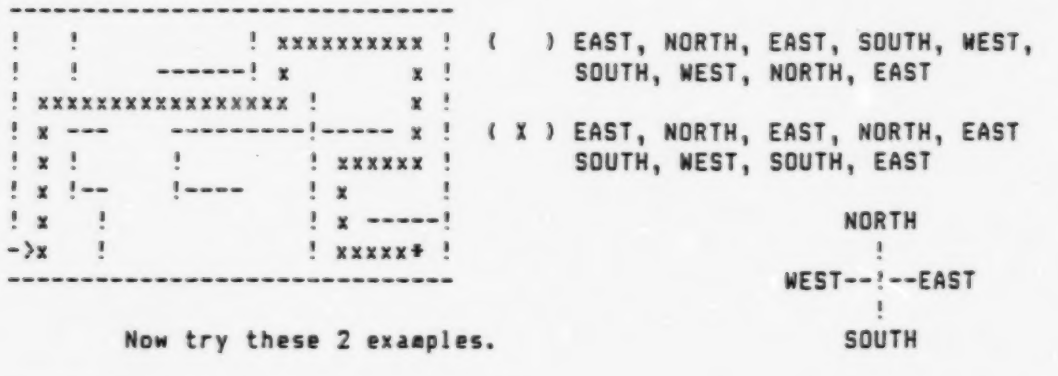
Mazeman Quiz

NOTES:

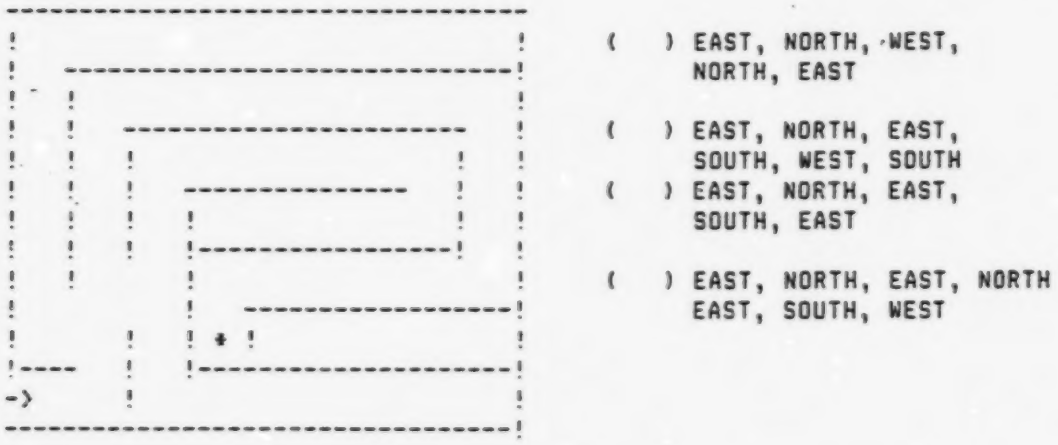
These exercises will serve as part of the basis for evaluating the success of the activities. They should therefore be kept by the teacher for future reference.

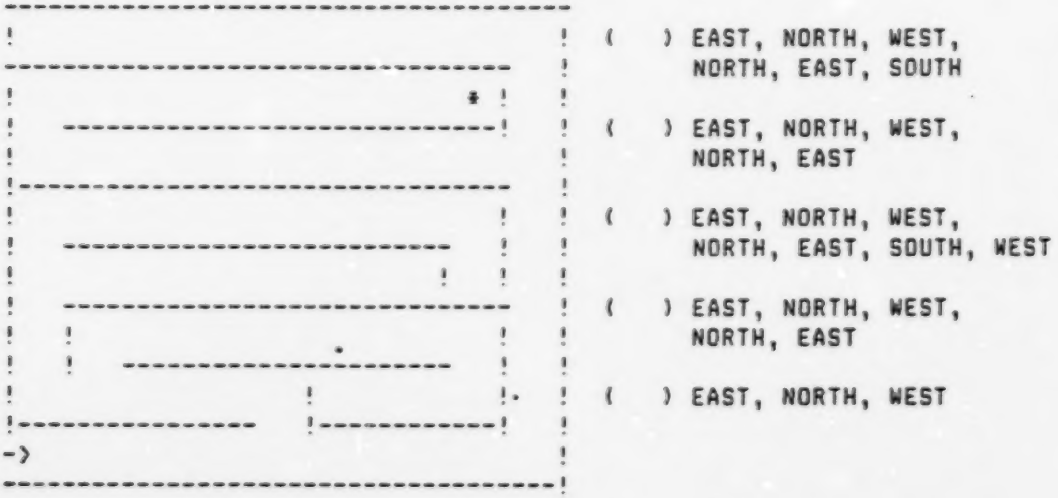
QUIZ: Mazeman NAME:

Hurkle has almost found his way home. He has found his way through the magic earth forest and is now entering a maze. You can help him by finding the correct directions. Read them carefully and try them out with a pencil if you need to. Put a mark in the box beside the right set of directions. Hurkle must get to the star (*). The first example is done for you.



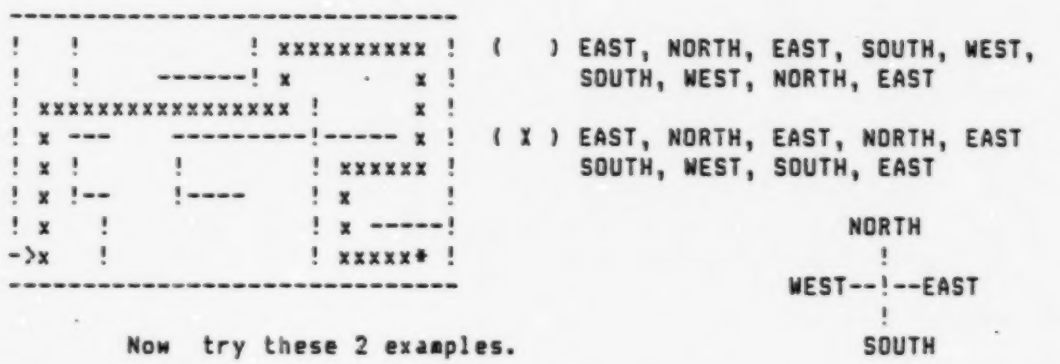
Now try these 2 examples.


( ) EAST, NORTH, WEST, NORTH, EAST
( ) EAST, NORTH, EAST, SOUTH, WEST, SOUTH
( ) EAST, NORTH, EAST, SOUTH, EAST
( ) EAST, NORTH, EAST, NORTH EAST, SOUTH, WEST

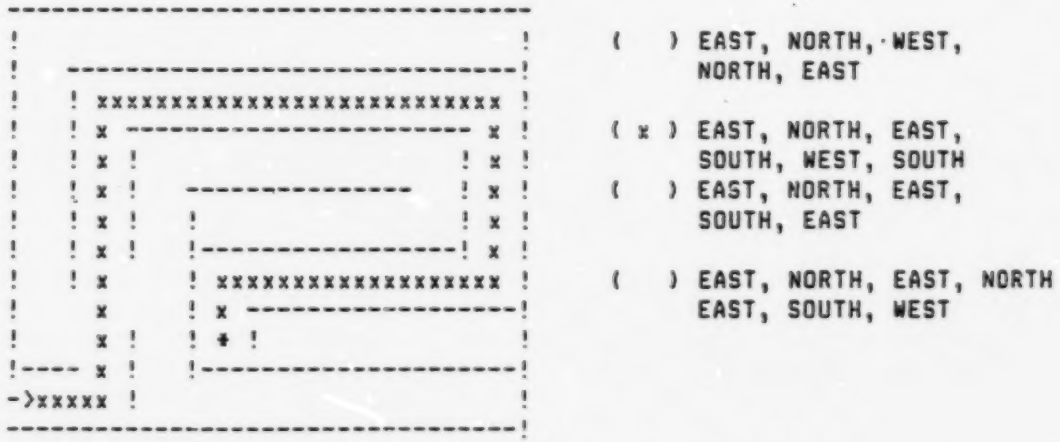

( ) EAST, NORTH, WEST, NORTH, EAST, SOUTH
( ) EAST, NORTH, WEST, NORTH, EAST
( ) EAST, NORTH, WEST, NORTH, EAST, SOUTH, WEST
( ) EAST, NORTH, WEST, NORTH, EAST
( ) EAST, NORTH, WEST

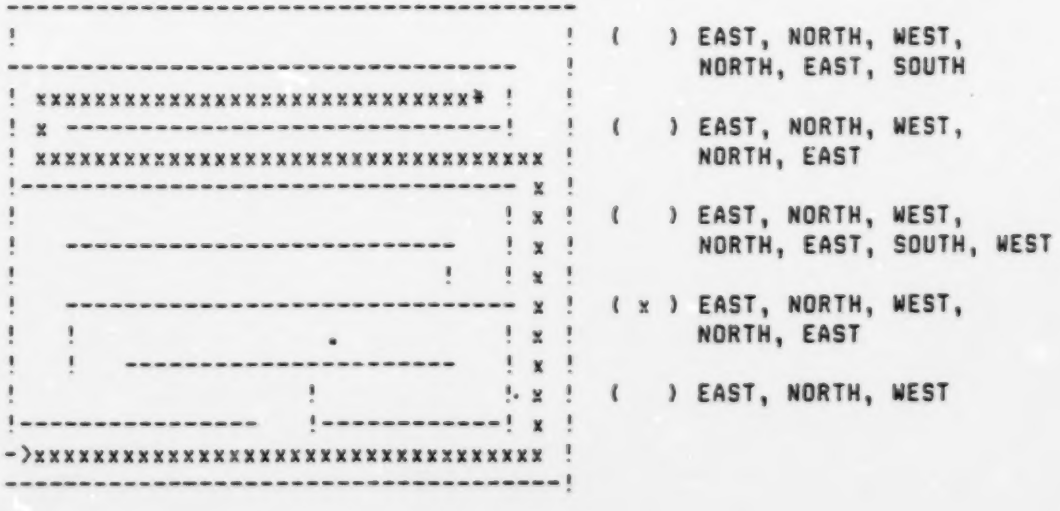
QUIZ: Mazeman (Teacher Answers) NAME:

Hurkle has almost found his way home. He has found his way through the magic earth forest and is now entering a maze. You can help him by finding the correct directions. Read them carefully and try them out with a pencil if you need to. Put a mark in the box beside the right set of directions. Hurkle must get to the star (*). The first example is done for you.



Now try these 2 examples.


( ) EAST, NORTH, WEST, NORTH, EAST
(x) EAST, NORTH, EAST, SOUTH, WEST, SOUTH
( ) EAST, NORTH, EAST, SOUTH, EAST
( ) EAST, NORTH, EAST, NORTH EAST, SOUTH, WEST


( ) EAST, NORTH, WEST, NORTH, EAST, SOUTH
( ) EAST, NORTH, WEST, NORTH, EAST
( ) EAST, NORTH, WEST, NORTH, EAST, SOUTH, WEST
(x) EAST, NORTH, WEST, NORTH, EAST
( ) EAST, NORTH, WEST

CLASS ACTIVITY/C-3

TITLE OF LESSON: "Intermediate Points"

GOALS: A,B

LEARNING OUTCOMES: 1,2

DESCRIPTION:

This second filmstrip/tape introduces the children to the intermediate compass points. The filmstrip also covers legend, scale and map location. The use of the complete filmstrip/tape is optional.

Further discussion using the blackboard or the overhead may be useful in reinforcing the various points.

Use of the Form-3 Hurkle GRID should be explained prior to the students beginning this activity.

TIME: 30 minutes

REQUIRED MATERIALS:

Filmstrip "Legend, Scale, Intermediate Directions, Location."

NOTES:

It is important that the students understand the use of the form which will be used to record their work. Special emphasis should be given to the use of two numbers separated by a comma to indicate a point on a grid. They should understand that the first number represents the horizontal line. It may be useful to make a transparency of the form.

GROUP ACTIVITY/6-3

TITLE OF ACTIVITY: Hurkle - Grid

GOALS: All

LEARNING OUTCOMES: All

DESCRIPTION:

This is the final small group activity. The same classroom management practices apply as in the previous small group activities.

In this particular activity the students should have three trials before using the record form. There are two record forms to be completed on two different occasions.

Students should be encouraged to discuss strategies for locating Hurkle in the limited number of turns.

TIME: Each group should take approximately 20 minutes.

REQUIRED MATERIALS:

Apple Computer
Hurkle Diskette
Form 3 - Hurkle Grid

NOTES:

It is very important that all the record forms be checked and returned to the envelopes. If there seems to be little success in finding Hurkle in the number of turns allowed it may be necessary to provide additional forms.

RECORD FORM 3: Hurkle - Grid

Print the numbers for each guess and mark with an "x". Print the clue which you are given. If you find Hurkle, put a circle where he was hiding.

Guess # 1

_,_ Put an "X" GO ?

Guess # 2

_,_ Put an "X" GO ?

Guess # 3

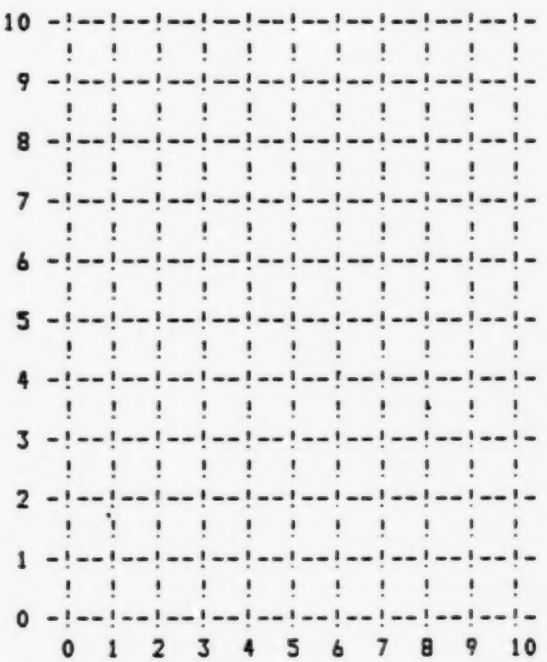
_,_ Put an "X" GO ?

Guess # 4

_,_ Put an "X" GO ?

Guess # 5

_,_ Put an "X" GO ?



STUDENT: RECORDER: HELPER:

DAY:

EVALUATION ACTIVITY/E-2

TITLE OF EVALUATION ACTIVITY: Plotter

GOALS: A,B,C

LEARNING OUTCOMES: 1,2

DESCRIPTION:

This activity follows the Hurkle - Grid activity and as with the previous evaluation activity it should be administered to the class as a whole upon completion of the small group activities.

A transparency may be made to illustrate with the class the solutions to the first two questions.

When these exercises have been corrected by the teacher and the marks recorded they can be returned and reviewed with the class. However, the exercises should be kept by the teacher for overall evaluation purposes.

TIME: 30 minutes

REQUIRED MATERIALS:

Plotter Quiz

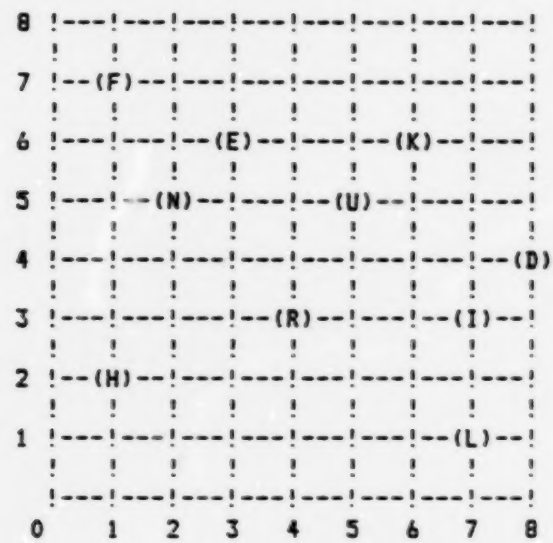
NOTES:

These exercises will serve as part of the basis for evaluating the success of the activities. They should therefore be kept by the teacher for future reference.

QUIZ: Plotter

NAME:

Hurkle has been given some directions but he can't find the right places. You can help Hurkle by finding the correct points on the map grid. Hurkle will be very happy if you will help.



The letter at 4,3 is (R) The numbers for "L" are (7,1)

The letter at 5,5 is ( ) The numbers for "K" are (,)

The letter at 1,2 is ( ) The numbers for "D" are (,)

The letter at 7,3 is ( ) The numbers for "F" are (,)

The letter at 2,5 is ( ) The numbers for "E" are (,)

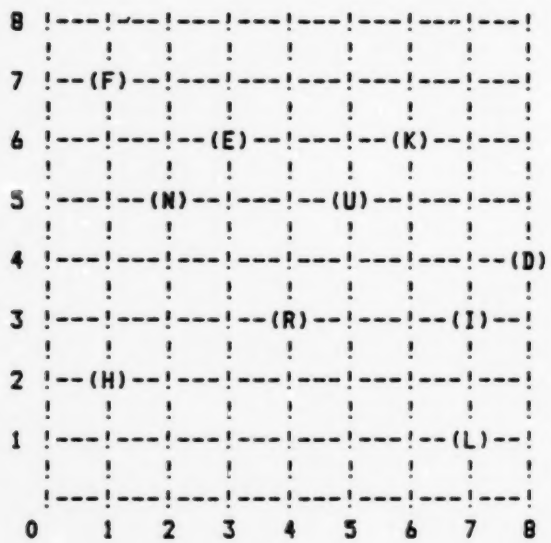
What words do these letters make? -- -- -- --

-- -- -- -- -- --

QUIZ: Plotter (TEACHER ANSWERS)

NAME:

Hurkle has been given some directions but he can't find the right places. You can help Hurkle by finding the correct points on the map grid. Hurkle will be very happy if you will help.



The letter at 4,3 is (R) The numbers for "L" are (7,1)

The letter at 5,5 is (U) The numbers for "K" are (6,6)

The letter at 1,2 is (H) The numbers for "D" are (8,4)

The letter at 7,3 is (I) The numbers for "F" are (1,7)

The letter at 2,5 is (N) The numbers for "E" are (3,6)

What words do these letters make?

F I N D
H U R K L E

CLASS ACTIVITY/C-4

TITLE OF LESSON: Class Walk

GOALS: A,C

LEARNING OUTCOMES: 1,4

DESCRIPTION:

This activity provides an opportunity to go outdoors and practice some of the compass skills which have been learned.

If possible, it would be useful to divide the class into smaller groups. However, if this is not possible the activity can be done as a class.

The object is to set up a short walk using compass directions and major features. A typical instruction might read, "Go North until you reach the wire wall." The students would go North until they reached a wire fence which would have a paper attached with a letter written on the paper. When the course is completed the letters should spell a word. The letters need not appear in order.

TIME: Approximately one hour

REQUIRED MATERIALS:

Compasses and a previously designed course.

NOTES:

This activity should show the students a practical application of the knowledge which they have acquired.

MODIFICATIONS TO THE MECC DISKETTE :

These modifications perform two functions:

1. The diskette when booted will automatically load and run the Hurkle program. There is no menu display allowing access to the other programs on the diskette.

2. The choices have been limited to three only: horizontal line, vertical line , and 10 x 10 grid. The fourth level is more diificult than would be expected at this grade level.

The modifications performed do not destroy the original programs. It is a simple task to restore the original diskette. However, if you are unsure of the procedures it is recommended that you make a copy of the diskette prior to modifying. The protection tab must be removed from the diskette for these changes to be made.

Modification 1 : This allows the Hurkle program to bypass the diskette menu.

1. Use the System Master DOS 3.3 to boot the computer.
2. Remove the System Master and insert the MECC diskette.
3. Type CATALOG (RETURN)
4. Type UNLOCK HELLO (RETURN)
5. Type RENAME HELLO, OLD HELLO (RETURN)
6. Type NEW (RETURN)
7. Type 100 REM MODIFICATION TO BYPASS THE MAIN MENU (RETURN)
8. Type 200 PRINT CHR$ (13); CHR$ (4);"RUN HURKLE" (RETURN)
9. Type 250 END (RETURN)
10. Type SAVE HELLO (RETURN)
11. Type LOCK HELLO (RETURN)

The modification is complete and the Hurkle program will run automatically when the diskette is booted.

Modification 2 : This modification will delete the fourth option from the menu.

1. Repeat steps 1 to 3 as noted in the previous modification.
2. Type UNLOCK HURKLE (RETURN)
3. Type LOAD HURKLE (RETURN)
4. Type LIST 1130 (RETURN)
   ** You will see the current contents of that program line.
5. Type 1130 (RETURN)
6. Type LIST 1150 (RETURN)
7. Type 1150 A = VAL (BK$):BK$ = "": IF A > 0 AND A < 4 AND A = INT (A) THEN 1155 (RETURN)
8. Type LIST 1152 (RETURN)
9. Type 1152 VTAB 1: HTAB 10: PRINT "ENTER 1-3 ONLY": GOTO 1140 (RETURN)
10. Type SAVE NEW HURKLE (RETURN)
11. Type RENAME HURKLE, OLD HURKLE (RETURN)
12. Type RENAME NEW HURKLE, HURKLE (RETURN)
13. Type LOCK OLD HURKLE (RETURN)
14 Type LOCK HURKLE (RETURN)

The program will now offer only options 1 to 3.

Restoring the diskette to its original state : The following instructions will delete any modifications and restore the original programs.

1. Repeat steps 1 to 3 as previously noted.
2. Type UNLOCK OLD HELLO (RETURN)
3. Type UNLOCK HELLO (RETURN)
4. Type UNLOCK OLD HURKLE (RETURN)
5. Type UNLOCK HURKLE (RETURN)
6. Type DELETE HURKLE (RETURN)
7. Type DELETE HELLO (RETURN)
8. Type RENAME OLD HURKLE, HURKLE (RETURN)
9. Type RENAME OLD HELLO, HELLO (RETURN)
10. Type LOCK HELLO (RETURN)
11. Type LOCK HURKLE (RETURN)

The diskette is now restored to its original state.

APPENDIX B: Oh, Deer ! GUIDE

TEACHER'S GUIDE:

TITLE OF COURSEWARE : Oh, Deer !
MECC
Version 1.0

GENERAL DESCRIPTION OF THE COURSEWARE :

Oh, Deer ! is a simulation which provides students the opportunity to discover the various factors involved in controlling the population of deer within a specific area. The program deals with environmental, social and random factors. It is applicable to both social studies and science.

GRADE LEVEL :

Elementary, Grades 5 - 9 . This guide is recommended for use at the Grade 7 level.

READING LEVEL : Grade 6 (Dale-Chall)

GOALS :

The goals listed below relate to a number of goals contained in B.C. Curriculum Guides. Those selected from the guides have been modified where necessary to reflect the goals of this program. A list of these reference sources is contained in the Reference Section. It is intended that Oh, Deer ! is an activity which meets the goals in a number of subject areas and is useful as an integrative activity.

Cognitive Goals :

A. Students will develop a knowledge of environmental principles.

B. Students will develop the ability to use the processes and skills of science.

C. Students will develop a knowledge of the different roles, responsibilities and rights of individuals in society.

Affective Goals :

D. Students will develop an appreciation for the factors which contribute to a wise use of the environment.

E. Students will become aware of the value of co-operative behavior.

F. Students will develop positive attitudes towards the use of computer simulations.

LEARNING OUTCOMES :

1. Students should be able to give definitions for the terms introduced in the simulation.

2. Students should be able to identify the factors which affect the size of the population.

3. Students should be able to interpret the information provided, formulate hypotheses and propose strategies to effectively and responsibly reduce the size of the deer population.

4. Students should be able to interpret the results of the actions taken during the simulation.

5. Students should be able to assume and defend particular roles as they consult in the group activities.

6. Students should demonstrate co-operative behavior and decision-making.

7. Students should demonstrate an enthusiasm for using simulations as a learning activity.

TEACHING STRATEGIES :

The unit should be presented as a combination of class and small group activities. The class lessons serve to introduce the unit, explain new concepts and vocabulary, and provide a forum to discuss the results. The small group activities allow the students to practise and reinforce the concepts. It is intended that these small group activities be set up in a learning station environment where groups of students would work at assigned times.

RELATIONSHIP BETWEEN ACTIVITIES, GOALS AND LEARNING OUTCOMES :

This chart lists the chronological order of the activities for this unit. The related goals and learning outcomes are noted for each activity. The preface "C" refers to a class lesson, "G" refers to a group activity, and "E" refers to an evaluation activity.

	ACTIVITY	GOALS	LEARNING OUTCOMES
C - 1	Introduction to Whitetail Hollow	A, D	1, 2
C - 2	Herd Management Demonstration	A,B,C,D	1, 2, 3, 4
G - 1	Herd Management Operation	All	All
C - 3	Public Hearing	A,B,C,D,E	1,2,3,5,6
E - 1	Mini-Project	A,B,C,D	1,2,3,4,5
E - 2	Eco-Quiz	A,B,C,D	1,2,3,4,5

LESSON PLANS :

The lessons are provided in a sequential pattern following the introductory pages.

LEARNING RESOURCES : The following learning resource is specified within this guide:

Oh, Deer ! Minnesota Educational Computing Consortium, 1983. (diskette & manual).

Selected pages were removed from the guide and reproduced for the class. The guide supplied with the diskette is used as a primary resource throughout this guide.

STUDENT HANDOUT: This consists of pages 22-31. The pages were duplicated with page 22 at the end. Pages 23-31 provide additional background. Page 22 provides a number of additional questions which may help students in clarifying the issues being dealt with.

GROUP ACTIVITY FORMS: The Student Instruction Sheet (page 17) was duplicated for each group. A new Management Report Form was designed. Five copies of this form were attached to each of the Student Instruction Sheets.

REFERENCE SOURCES :

The following curriculum documents have been used in the preparation of this guide.

Elementary Science Curriculum Guide . Victoria: Ministry of Education, 1981.

Social Studies Curriculum Guide: Grade One to Seven . Victoria, Ministry of Education, 1983.

LESSON PLANS :

CLASS ACTIVITY/C-1

TITLE OF LESSON: Introduction to Whitetail Hollow

GOALS: A, D

LEARNING OUTCOMES: 1, 2

DESCRIPTION: This should be the first exposure to the use of this simulation. The teacher should read the background information sheet provided on page 2 of the original guide. Time should be available for students to discuss the new vocabulary and concepts that are introduced. The teacher should then run the first option of the simulation. This will provide the setting for the activities to follow.

TIME: Approximately 1 hour

REQUIRED MATERIALS:

Page 2 of the Teacher's Guide
Simulation Diskette

NOTES: The computer and a large monitor are required for this activity.

CLASS ACTIVITY/C-2

TITLE OF LESSON: Herd Management Demonstration

GOALS: A, B, C, D

LEARNING OUTCOMES: 1, 2, 3, 4

DESCRIPTION: This lesson is an opportunity for the complete class to see the operation of the herd management program. Students should be shown what is required for record-keeping purposes. The trial forms are provided for this purpose. By selecting or prompting questions from students, the class should develop some understanding of the complexity of the problem.

At the end of the management simulation the students are given the individual handouts. These provide detailed background materials. The last page of the handout contains questions which students should consider as they run the simulation in small groups.

TIME: Approximately 1 hour

REQUIRED MATERIALS:

- Simulation Diskette
- Trial Group Activity Forms
- Student Handouts

NOTES: The computer and large monitor are required for this activity.

MANAGEMENT REPORT FORM
FALL POPULATION

GROUP:

MEMBERS:

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
POPULATION CLASS:					
Fawn Female					
Fawn Male					
Yearling Female					
Yearling Male					
Adult Female					
Adult Male					
TOTAL					
COSTS:					
Management Cost					
Damages					
Car/Deer					
Landscape					
ACTION SUMMARY:					
Public Response					
Approval					
Disapproval					
Management Choice					!!!

GROUP ACTIVITY GUIDE/6-1

TITLE OF ACTIVITY: Herd Management Operation

GOALS: All

LEARNING OUTCOMES: All

DESCRIPTION: The computer should be set up in a learning station environment. Students take on different roles and run this simulation. It is suggested that the group size be limited to 3 or 4 students. Care should be taken in completing the record forms as the simulation is run. The forms provide ongoing information to students regarding their progress in reaching the goal.

TIME: It should take each group approximately 30 minutes to run the simulation for a five year cycle.

REQUIRED MATERIALS:

- Simulation Diskette
- Group Activity Forms
- Role Cards

NOTES: Groups should be provided with individual packages. Students should fill in their names and select a group name. The groups are given 5 forms each representing a 5 year cycle. Each group should complete at least three of the forms.

The record forms are useful for the teacher in reviewing the progress of the students.

The packages should also contain the role cards. These may be the same as those supplied with the original guide or the teacher may develop a different set.

MANAGEMENT REPORT FORM
FALL POPULATION

GROUP:

MEMBERS:

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
POPULATION CLASS:					
Fawn Female					
Fawn Male					
Yearling Female					
Yearling Male					
Adult Female					
Adult Male					
TOTAL					
COSTS:					
Management Cost					
Damages					
Car/Deer					
Landscape					
ACTION SUMMARY:					
Public Response					
Approval					
Disapproval					
Management Choice					

CLASS ACTIVITY/C-3

TITLE OF LESSON: Public Hearing

GOALS: A,B,C,D,E

LEARNING OUTCOMES: 1,2,3,5,6

DESCRIPTION: This lesson is intended to simulate a public hearing. The issue is, "All deer should be removed from Whitetail Hollow." Students take on roles as:

Chairperson (3)

Representatives from the Wildlife Protection Agency (3) AGAINST

Representatives from the Urban Development Association (3) FOR

Representatives from the Department of Regional Planning (3) NEUTRAL

Students have a short period of time to prepare each group's version of the facts. These viewpoints are then presented to the class. Student's in the audience are encouraged to write down questions as the presentations take place. After the presentations the chairperson invites questions from the floor.

TIME: This activity takes approximately 1 hour.

REQUIRED MATERIALS: No special materials are required.

NOTES: It is NOT necessary that the students reach a decision FOR or AGAINST the issue.

EVALUATION ACTIVITY/E-1

TITLE OF EVALUATION ACTIVITY: Mini-Project

GOALS: A,B,C,D

LEARNING OUTCOMES: 1,2,3,4,5

DESCRIPTION: Students are given the Mini-Project sheets. The information required to complete this project is contained in the student handouts distributed at the beginning of the unit. Students may discuss the project but individual project sheets should be handed in.

TIME: This is intended as an ongoing activity and may be given to students at any point during the unit. This may be a useful activity during the time that other students are using the simulation.

REQUIRED MATERIALS:

Student Handouts
Mini-Project Sheets

NOTES:

These exercises will serve as part of the basis for evaluating the success of the activities. They should therefore be kept by the teacher for future reference.

STUDENT NAME:_____

Mini-Project - Oh, Deer !
Deer Populations

Write in your own words, sentences and short paragraphs which provide the information on each of the following topics:

1. Habitat
   a. Requirements
   b. size

2. "Deer Yard"

3. Good nutrition and how it affects reproduction of the herd

4. Three age ranges for deer

5. Three laws of nature that affect the deer population

6. Seasonal Changes: Describe the major events in the life of the deer which occur at each season.

   Winter: Food
   Physical Appearance

   Spring: Food
   Reproductive Cycle
   Physical Appearance

   Summer: Food
   Physical Appearance

   Fall : Food
   Reproductive Cycle
   Physical Appearance

7. Negative Factors which influence deer populations

   1. Natural
   2. Dependent on Man

EVALUATION ACTIVITY/E-2

TITLE OF EVALUATION ACTIVITY: Eco-Quiz

GOALS: A,B,C,D

LEARNING OUTCOMES: 1,2,3,4,5

DESCRIPTION: This is an individual activity. It tests the terms and concepts acquired during the unit. Students should not have access to reference materials for this exercise.

TIME: Approximately 30 minutes

REQUIRED MATERIALS:

Eco-Quiz

NOTES:

These exercises will serve as part of the basis for evaluating the success of the activities. They should therefore be kept by the teacher for future reference.

STUDENT NAME: _____

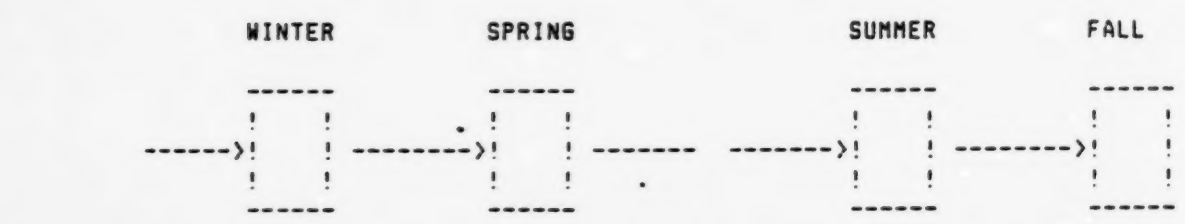
ECO-QUIZ: PAGE 1

A. Place the number located before each of the terms in the left hand column with its correct definition in the right hand column . (Question Value = 8)

1. BALANCE	__ Type of environment an animal needs to live
2. CARRYING CAPACITY	__ Damage caused by native animals
3. BROWSE	__ To make things even
4. ADAPTABILITY	__ Number of animals the land can support on a continuing basis
5. HABITAT	__ Process by which animals produce their young
6. DEPREDATION	__ Woody plants eaten by deer
7. MORTALITY	__ Number of deaths in a given place or time
8. REPRODUCTION	__ Adjusting to changes

B. Place the number (1 - 10) located at the beginning of the sentences into the correct box. (Question Value = 10)

1. Deer regain weight lost when food was scarcer.
2. Hardship season for deer
3. Months of plentiful food
4. Bucks lose antlers
5. Does begin fawning
6. Beginning of the mating season
7. Deer put on weight preparing for leaner months
8. Coats become smooth and shiny
9. Antler growth begins
10. Doe and buck have a heavy coat of grey fur.



STUDENT NAME: Teacher Answers

ECO-QUIZ: PAGE 2

C. Pick two of the following methods of deer control and give reasons FOR and AGAINST the use of this method. Answer on the back of the sheet. (Question Value = 8)

1. Remove deer by shooting.
2. Remove deer by trapping.
3. Plant food for deer in areas away from homes.
4. Spray repellants on shrubs the deer are eating.
5. Scare deer away from homes.

METHOD 1:

REASONS FOR:

REASONS AGAINST:

METHOD 2:

REASONS FOR:

REASONS AGAINST:

** Answers may vary. Teacher will require an overall knowledge of the student materials to judge the responses.

APPENDIX C: ATTITUDE SURVEYS

The surveys in this appendix are reproduced in the same form as they were used.

Primary Student Survey :

INSTRUCTIONS TO THE INTERVIEWER:

A direct approach is used by reading the noted passage at the beginning of the questionnaire.

The interview questionnaire is designed primarily with closed questions. The purpose of the questions is to provide a framework for the interview with the students. It is useful to record a YES/NO/DON'T KNOW type of initial response wherever possible for each question. Additional responses should then be recorded. Further responses may be prompted by using the question, "Why or why not?" or any other suitable probe. The open question is designed to give the students an opportunity to express any opinions or feelings which have not been explored with the closed questions.

The students should be aware that this is not a test of any sort. It is an opportunity for them to tell you what they think of the program. Please record the students name and sex at each interview.

Hurkle
ATTITUDE INTERVIEW (PRIMARY)

"I'm going to ask you some questions about the Hurkle program which you were using in class. We're interested in finding out what you thought about using Hurkle . This is not a test and there are no right or wrong answers to the questions. Please answer with what YOU think about each question. If you don't understand the question please tell me. I'm going to make some notes while you are talking because I might have trouble remembering all the answers. Shall we start?"

THEME: ENJOYMENT

1. Did you like playing Hurkle ?
   2. Was it like a game that you would play for fun?
   3. Would you like to use more games like this?

THEME: LEARNING EFFECTIVENESS

4. Did playing Hurkle teach you anything new?
   5. Do you think this is a good way to learn things?
   6. Would you like to learn more things this way?

THEME: GROUP INTERACTION

7. Were you able to help each other to find Hurkle?
   8. Did you like having someone else help you find Hurkle?
   9. Was it better to have someone helping you to find Hurkle?

THEME: COMPUTER/PROGRAM INTERACTION

10. Did you have any problems working with the computer to find Hurkle?
    11. Did the pictures and words on the TV help you find Hurkle?
    12. Was it difficult to type in what you wanted the computer to do?

THEME: OPEN QUESTION

What would you tell a friend about Hurkle ?

Intermediate Student Survey :

Oh, Deer !

ATTITUDE SURVEY (INTERMEDIATE LEVEL)

Name: _____

The program, Oh, Deer ! is called a simulation program because it takes a real life situation and uses the computer to make it real in the classroom. It would be nice to know what you thought of the program. Circle the word which tells how you feel about each question. Please remember that there are no right or wrong answers. This is not a test.

1. Did you like using the simulation?	YES	NO	DON'T KNOW
2. Did the simulation teach you anything new?	YES	NO	DON'T KNOW
3. Did it help to work with others in a group?	YES	NO	DON'T KNOW
4. Did you have any problems following the simulation instructions?	YES	NO	DON'T KNOW
5. Would you like to use more simulations in your class work?	YES	NO	DON'T KNOW
6. Did you like having someone work with you during the simulation?	YES	NO	DON'T KNOW
7. Do you think simulations are a good way to learn?	YES	NO	DON'T KNOW
8. Did you have any difficulty understanding the information on the screen?	YES	NO	DON'T KNOW
9. Was it better to work with others when using this program?	YES	NO	DON'T KNOW
10. Would you like to learn more things using simulations?	YES	NO	DON'T KNOW
11. Did you have any problems giving instructions to the computer?	YES	NO	DON'T KNOW
12. Was the simulation something you would do for fun in your spare time?	YES	NO	DON'T KNOW

Please complete the following statements. Use the back side of the paper to write your answers. Be sure to put an A or B with your answers.

A. Things I liked about using the program Oh, Deer !:
B. Things I didn't like about using the program Oh, Deer !:

Primary Parent Survey :

PARENT SURVEY
COMPUTER PROJECT - Hurkle GAME

Thank you for taking the time to answer this survey. The results will be used as part of a Masters degree project. The project is approved by the Superintendent for the School District and the participating staff members at this school. It is also supported by the Educational Research Institute of B.C. and the B.C Teacher's Federation. Your co-operation is valued highly.

The responses to this survey do not require you to give your name. However, when returning this survey to the school, please ask your child to be sure to tell the teacher that the survey has been returned.

Your child has been using a computer game titled Hurkle . The object of the game is to locate a furry animal which hides on vertical and horizontal number lines as well as a 10 X 10 grid. The students use compass directions to locate Hurkle. The program teaches and reinforces number line concepts, compass directions, and problem-solving skills. The students work in groups to develop strategies for the game.

Before you answer the survey would you please take a moment to ask your child the questions on the last page of this form. After you have heard your child's responses would you please answer the questions contained in the parent survey portion. Your responses should be based on how you feel about the statements after considering the answers which you received from your child.

Again, I thank you for your co-operation in this survey. A copy of the project will be placed in the school in the Fall. Please return this survey before June 27, 1984.

John Godfreyson

PARENT SURVEY:

The person answering the survey is the child's (please circle)

Mother

Father

Both

The child involved in the project is a (please circle)

Boy

Girl

Please circle the number of the statement which reflects your current situation.

1. We own a computer at home.
2. We plan to buy a computer.
3. We have no plans to buy a computer.

Definitions: Please note the definitions of the following terms as they apply to this survey.

Game: a computer program which is fun to play and contains specific educational goals.

Group activity: a situation in which two to six students work co-operatively to reach a common goal.

Explanation of Ratings:

SA Strongly Agree
A Agree
D Disagree
SD Strongly Disagree
N No opinion

Please circle the rating which reflects how you feel about the following statements.

1. Computers should be used in education as learning tools.	SA	A	D	SD	N
2. The ability to use computers is an important skill for children to learn for the future.	SA	A	D	SD	N
3. Computer games can be used as learning tools.	SA	A	D	SD	N
4. Schools should make more use of computer games for learning.	SA	A	D	SD	N
5. Enjoyment of learning is important.	SA	A	D	SD	N
6. Computer games can increase the enjoyment of learning.	SA	A	D	SD	N
7. Primary children are capable of using computer games for learning.	SA	A	D	SD	N
8. Primary children should make greater use of computer games for learning.	SA	A	D	SD	N
9. Students working in groups at a computer can learn from each other.	SA	A	D	SD	N
10. Allowing children to work together at computer games should be encouraged.	SA	A	D	SD	N

Please use the space on the following page for any additional comments. If your comments are related to a specific question, please note the number of the question. If you require additional space please answer on another sheet and attach to the survey.

PARENT COMMENTS:

QUESTIONS FOR YOUR CHILD: Please note that the answers do not have to be written down. This is simply an opportunity for your child to tell you about the game.

1. Did you have fun playing the game Hurkle? Why or why not?
2. What did you learn from playing the game Hurkle ?
3. Did you like working in a group? Why?
4. Was it easy or difficult to play the game? Why?

Intermediate Parent Survey :

PARENT SURVEY
COMPUTER PROJECT - OH , DEER ! SIMULATION

Thank you for taking the time to answer this survey. The results will be used as part of a Masters degree project. The project is approved by the Superintendent for the School District and the participating staff members at this school. It is also supported by the Educational Research Institute of B.C. and the B.C Teacher's Federation. Your co-operation is valued highly.

The responses to this survey do not require you to give your name. However, when returning this survey to the school, please ask your child to be sure to tell the teacher that the survey has been returned.

Your child has been using a simulation titled, OH , DEER ! The object of the simulation is to reduce and maintain a sample deer population at the correct level. The students work in groups and must consider the opinions of others. The program teaches some basic knowledge about deer habitat and reproductive cycles. The students develop problem-solving strategies and learn co-operative behavior in reaching decisions.

Before you answer the survey would you please take a moment to ask your child the questions on the back of the form. After you have heard your child's responses would you please answer the questions contained in the parent survey portion. Your responses should be based on how you feel about the statements after considering the answers which you received from your child.

Again, I thank you for your co-operation in this survey. A copy of the project will be placed in the school in the Fall. Please return the survey before June 27, 1984.

John Godfreyson

PARENT SURVEY:

The person answering the survey is the child's (please circle)

Mother

Father

Both

The child involved in the project is a (please circle)

Boy

Girl

Please circle the number of the statement which reflects your current situation.

1. We own a computer at home.
2. We plan to buy a computer.
3. We have no plans to buy a computer.

Definitions: Please note the definitions of the following terms as they apply to this survey.

Simulation: a computer program which is a model of a real-life situation and has specific educational goals.

Group activity: a situation in which two to six students work co-operatively to reach a common goal.

Explanation of Ratings:

SA Strongly Agree
A Agree
D Disagree
SD Strongly Disagree
N No opinion

Please circle the rating which reflects how you feel about the following statements.

1. Computers should be used in education as learning tools.	SA	A	D	SD	N
2. The ability to use computers is an important skill for children to learn for the future.	SA	A	D	SD	N
3. Computer simulations can be used as learning tools.	SA	A	D	SD	N
4. Schools should make more use of computer simulations as learning tools.	SA	A	D	SD	N
5. Enjoyment of learning is important.	SA	A	D	SD	N
6. Computer simulations can increase the enjoyment of learning.	SA	A	D	SD	N
7. Elementary children are capable of using computer simulations as learning tools.	SA	A	D	SD	N
8. Elementary children should make greater use of computer simulations for learning.	SA	A	D	SD	N
9. Students working in groups at a computer can learn from each other.	SA	A	D	SD	N
10. Allowing children to work together at computer simulations should be encouraged.	SA	A	D	SD	N

Please use the space on the following page for any additional comments. If your comments are related to a specific question, please note the number of the question. If you require additional space please answer on another sheet and attach to the survey.

PARENT COMMENTS:

QUESTIONS FOR YOUR CHILD: Please note that the answers do not have to be written down. This is simply an opportunity for your child to tell you about the simulation.

1. Did you enjoy using the simulation? Why or why not?
2. What did you learn from using the simulation?
3. Was it important to work in a group? Why or why not?
4. Was it easy or difficult to use the simulation? Why?

Primary Teacher Survey :

TEACHER INTERVIEW
Hurkle GAME

"The purpose of this interview is to obtain your opinions about the use of the Hurkle game in your classroom. I would also like to know about your feelings and attitudes towards the use of computer games as a teaching and learning tool. Please feel free to express your personal opinions on the following questions."

---

1. Did the students enjoy playing the Hurkle game? How could you tell?

2. Do you feel that this was an effective learning tool considering the age of the children and the curriculum goals for this grade? Please explain.

3. Was it beneficial for the students to work in groups? Were there any problems associated with the group work? Please explain.

4. Did the students experience any difficulty working with the computer or the actual game program? If so, please explain.

5. Did the implementation guide help you in using the program with the children? What would you change?

6. How useful were the daily record sheets? What would you change?

7. How useful were the additional activities? What would you change?

8. How useful were the evaluation materials? What would you change?

9. On a scale from 1 (low) to 10 (high), how would you rate this program on the basis of overall usefulness as a classroom activity for the students? Please explain.

10. Based on your experiences with this project, would you consider working on other similar projects with your class? Please explain.

Intermediate Teacher Survey :

TEACHER INTERVIEW
OH , DEER! SIMULATION

"The purpose of this interview is to obtain your opinions about the use of the OH , DEER! simulation in your classroom. I would also like to know about your feelings and attitudes towards the use of computer simulations as a teaching and learning tool. Please feel free to express your personal opinions on the following questions."

---

1. Did the students enjoy using the Oh, Deer ! simulation? How could you tell?

2. Do you feel that this was an effective learning tool considering the age of the children and the curriculum goals for this grade? Please explain.

3. Was it beneficial for the students to work in groups? Were there any problems associated with the group work? Please explain.

4. Did the students experience any difficulty working with the computer or the actual simulation program? If so, please explain.

5. Did the implementation guide help you in using the program with the children? What would you change?

6. How useful were the record sheets? What would you change?

7. How useful were the additional activities? What would you change?

8. How useful were the evaluation materials? What would you change?

9. On a scale from 1 (low) to 10 (high), how would you rate this program on the basis of overall usefulness as a classroom activity for the students? Please explain.

10. Based on your experiences with this project, would you consider working on other similar projects with your class? Please explain.

APPENDIX D: DETAILED DATA SUMMARY

This appendix contains the statistical data calculated from an analysis of the responses to the student and parent surveys. The data has been analyzed for the whole population as well as individual groups within the population.

Primary Student Survey :

THEME: ENJOYMENT

Did you like playing Hurkle ?

	MEAN	S.D.
*All Students	3.00	0.00
Boys Only	3.00	0.00
Girls only	3.00	0.00
Location A	3.00	0.00
Location B	3.00	0.00

Was it like a game that you would play for fun?

	MEAN	S.D.
*All Students	2.91	0.37
Boys Only	2.84	0.49
Girls Only	3.00	0.00
Location A	3.00	0.00
Location B	2.79	0.56

Would you like to use more games like this?

	MEAN	S.D.
*All Students	3.00	0.00
Boys Only	3.00	0.00
Girls Only	3.00	0.00
Location A	3.00	0.00
Location B	3.00	0.00

THEME: LEARNING EFFECTIVENESS

Did playing Hurkle teach you anything new?

	MEAN	S.D.
*All Students	2.89	0.40
Boys Only	2.84	0.49
Girls Only	2.94	0.24
Location A	2.86	0.47
Location B	2.93	0.26

Do you think this is a good way to learn things?

	MEAN	S.D.
*All Students	2.97	0.17
Boys Only	2.95	0.22
Girls Only	3.00	0.00
Location A	2.95	0.21
Location B	3.00	0.00

Would you like to learn more things this way?

	MEAN	S.D.
*All Students	3.00	0.00
Boys Only	3.00	0.00
Girls Only	3.00	0.00
Location A	3.00	0.00
Location B	3.00	0.00

THEME: GROUP INTERACTION

Were you able to help each other to find Hurkle?

	MEAN	S.D.
*All Students	2.94	0.33
Boys Only	3.00	0.00
Girls Only	2.88	0.48
Location A	2.91	0.43
Location B	3.00	0.00

Did you like having someone else help you find Hurkle?

	MEAN	S.D.
*All Students	2.69	0.71
Boys Only	2.68	0.73
Girls Only	2.69	0.68
Location A	2.67	0.71
Location B	2.71	0.70

Was it better to have someone helping you to find Hurkle?

	MEAN	S.D.
*All Students	2.77	0.59
Boys Only	2.74	0.64
Girls Only	2.81	0.53
Location A	2.81	0.50
Location B	2.71	0.70

THEME: COMPUTER/PROGRAM INTERACTION

Did you have any problems working with the computer to find Hurkle?

	MEAN	S.D.
*All Students	1.29	0.66
Boys Only	1.26	0.64
Girls Only	1.31	0.68
Location A	1.19	0.59
Location B	1.43	0.73

Did the pictures and words on the TV help you find Hurkle?

	MEAN	S.D.
*All Students	2.91	0.37
Boys Only	2.90	0.45
Girls Only	2.94	0.24
Location A	2.95	0.21
Location B	2.86	0.52

Was it difficult to type in what you wanted the computer to do?

	MEAN	S.D.
*All Students	1.20	0.52
Boys Only	1.16	0.49
Girls Only	1.25	0.56
Location A	1.10	0.29
Location B	1.36	0.72

Intermediate Student Survey :

THEME: ENJOYMENT

Did you like using the simulation?

	MEAN	S.D.
*All Students	2.78	0.51
Boys Only	2.69	0.61
Girls Only	2.87	0.34
Location A	2.85	0.36
Location B	2.68	0.63

Would you like to use more simulations in your class work?

	MEAN	S.D.
*All Students	2.57	0.70
Boys Only	2.65	0.68
Girls Only	2.48	0.71
Location A	2.59	0.73
Location B	2.55	0.66

Was the simulation something you would do for fun in your spare time?

	MEAN	S.D.
*All Students	2.16	0.89
Boys Only	2.19	0.92
Girls Only	2.13	0.85
Location A	2.19	0.86
Location B	2.14	0.92

THEME: LEARNING EFFECTIVENESS

Did the simulation teach you anything new?

	MEAN	S.D.
*All Students	2.67	0.65
Boys Only	2.65	0.68
Girls Only	2.70	0.62
Location A	2.74	0.52
Location B	2.59	0.78

Do you think simulations are a good way to learn?.

	MEAN	S.D.
*All Students	2.63	0.60
Boys Only	2.73	0.59
Girls Only	2.52	0.58
Location A	2.56	0.63
Location B	2.73	0.54

Would you like to learn more things using simulations?

	MEAN	S.D.
*All Students	2.43	0.76
Boys Only	2.62	0.68
Girls Only	2.22	0.78
Location A	2.37	0.82
Location B	2.50	0.66

THEME: GROUP INTERACTION

Did it help to work with others in a group?

	MEAN	S.D.
*All Students	2.29	0.81
Boys Only	2.31	0.82
Girls Only	2.26	0.79
Location A	2.45	0.74
Location B	2.09	0.85

Did you like having someone work with you during the simulation?

	MEAN	S.D.
*All Students	2.14	0.88
Boys Only	2.12	0.93
Girls Only	2.17	0.82
Location A	2.00	0.90
Location B	2.32	0.82

Was it better to work with others when using this program?

	MEAN	S.D.
*All Students	2.31	0.86
Boys Only	2.35	0.88
Girls Only	2.26	0.85
Location A	2.19	0.94
Location B	2.45	0.72

THEME: COMPUTER/PROGRAM INTERACTION

Did you have any problems following the simulation instructions?

	MEAN	S.D.
*All Students	1.23	0.55
Boys Only	1.23	0.50
Girls Only	1.22	0.59
Location A	1.22	0.50
Location B	1.23	0.60

Did you have any difficulty understanding the information on the screen?

	MEAN	S.D.
*All Students	1.16	0.51
Boys Only	1.19	0.56
Girls Only	1.13	0.45
Location A	1.15	0.52
Location B	1.18	0.49

Did you have any problems giving instructions to the computer?

	MEAN	S.D.
*All Students	1.27	0.63
Boys Only	1.23	0.64
Girls Only	1.30	0.62
Location A	1.26	0.64
Location B	1.27	0.62

Primary Parent Attitude Survey :

RELATIONSHIP OF RESPONDENTS:

	%
Mother	83.3
Father	13.3
Did not respond	3.3

COMPUTER OWNERSHIP/ACQUISITION:

	%
Own a computer at home	20.0
Plan to buy a computer	33.3
No plans to buy a computer	33.3
Did not respond	13.3

THEME: COMPUTERS AND EDUCATION

Computers should be used in education as learning tools.

	MEAN	S.D.
*All Parents	4.33	0.65
Location A	4.17	0.71
Location B	4.54	0.50
Respondent: Father	4.50	0.50
Respondent: Mother	4.32	0.68
Child: Boy	4.29	0.75
Child: Girl	4.42	0.49
Computer: Own	4.67	0.47
Computer: Plans	4.50	0.50
Computer: No Plans	4.09	0.79

The ability to use computers is an important skill for children to learn for the future.

	MEAN	S.D.
*All Parents	4.60	0.50
Location A	4.53	0.50
Location B	4.69	0.46
Respondent: Father	4.50	0.50
Respondent: Mother	4.60	0.49
Child: Boy	4.59	0.49
Child: Girl	4.58	0.49
Computer: Own	4.83	0.37
Computer: Plans	4.80	0.40
Computer: No Plans	4.40	0.49

THEME: COMPUTER GAMES AND EDUCATION

Computer games can be used as learning tools.

	MEAN	S.D.
*All Parents	4.23	0.42
Location A	4.18	0.38
Location B	4.31	0.46
Respondent: Father	4.25	0.43
Respondent: Mother	4.24	0.43
Child: Boy	4.24	0.42
Child: Girl	4.25	0.43
Computer: Own	4.33	0.47
Computer: Plans	4.30	0.46
Computer: No Plans	4.20	0.40

Schools should make more use of computer games for learning.

	MEAN	S.D.
*All Parents	4.10	0.70
Location A	3.94	0.80
Location B	4.31	0.46
Respondent: Father	4.25	0.43
Respondent: Mother	4.08	0.74
Child: Boy	4.06	0.64
Child: Girl	4.17	0.80
Computer: Own	4.33	0.47
Computer: Plans	4.30	0.46
Computer: No Plans	3.80	0.98

THEME: ENJOYMENT OF LEARNING

Enjoyment of learning is important.

	MEAN	S.D.
*All Parents	4.77	0.43
Location A	4.82	0.38
Location B	4.69	0.46
Respondent: Father	4.75	0.43
Respondent: Mother	4.76	0.43
Child: Boy	4.77	0.42
Child: Girl	4.75	0.43
Computer: Own	4.50	0.50
Computer: Plans	5.00	0.00
Computer: No Plans	4.60	0.49

Computer games can increase the enjoyment of learning.

	MEAN	S.D.
*All Parents	4.23	0.67
Location A	4.24	0.73
Location B	4.23	0.58
Respondent: Father	4.25	0.43
Respondent: Mother	4.24	0.71
Child: Boy	4.29	0.75
Child: Girl	4.25	0.43
Computer: Own	4.50	0.50
Computer: Plans	4.30	0.46
Computer: No Plans	4.10	0.94

THEME: ABILITY TO USE COMPUTER GAMES

Primary children are capable of using computer games for learning.

	MEAN	S.D.
*All Parents	4.10	0.70
Location A	4.06	0.64
Location B	4.15	0.77
Respondent: Father	4.25	0.43
Respondent: Mother	4.08	0.74
Child: Boy	4.24	0.73
Child: Girl	3.92	0.64
Computer: Own	4.33	0.47
Computer: Plans	4.20	0.40
Computer: No Plans	3.90	1.04

Primary children should make greater use of computer games for learning.

	MEAN	S.D.
*All Parents	3.80	0.91
Location A	3.77	1.00
Location B	3.85	0.77
Respondent: Father	5.00	0.00
Respondent: Mother	3.76	0.99
Child: Boy	3.88	0.96
Child: Girl	3.67	0.85
Computer: Own	4.17	1.07
Computer: Plans	4.10	0.54
Computer: No Plans	3.40	1.02

THEME: COMPUTERS AND GROUP ACTIVITIES

Students working in groups at a computer can learn from each other.

	MEAN	S.D.
*All Parents	4.17	0.97
Location A	4.00	1.19
Location B	4.38	0.49
Respondent: Father	4.75	0.43
Respondent: Mother	4.04	1.00
Child: Boy	4.18	0.92
Child: Girl	4.17	1.07
Computer: Own	4.33	0.47
Computer: Plans	4.60	0.49
Computer: No Plans	3.70	1.42

Allowing children to work together at computer games should be encouraged.

	MEAN	S.D.
*All Parents	4.07	0.85
Location A	3.88	0.96
Location B	4.31	0.61
Respondent: Father	4.50	0.50
Respondent: Mother	4.00	0.89
Child: Boy	4.00	0.91
Child: Girl	4.17	0.80
Computer: Own	4.33	0.47
Computer: Plans	4.40	0.49
Computer: No Plans	3.60	1.20

Intermediate Parent Attitude Survey :

RELATIONSHIP OF RESPONDENTS:

	%
Mother	72.7
Father	21.2
Both	6.1

COMPUTER OWNERSHIP/ACQUISITION:

	%
Own a computer at home	39.4
Plan to buy a computer	15.2
No plans to buy a computer	39.4
Did not respond	6.0

NOTE: The breakdown of responses by both parents is not given due to the small number of respondents in this category.

THEME: COMPUTERS AND EDUCATION

Computers should be used in education as learning tools.

	MEAN	S.D.
*All Parents	4.55	0.50
Location A	4.50	0.50
Location B	4.67	0.47
Respondent: Father	4.71	0.45
Respondent: Mother	4.46	0.50
Child: Boy	4.59	0.49
Child: Girl	4.50	0.50
Computer: Own	4.77	0.42
Computer: Plans	4.20	0.40
Computer: No Plans	4.46	0.50

The ability to use computers is an important skill for children to learn for the future.

	MEAN	S.D.
*All Parents	4.70	0.46
Location A	4.71	0.46
Location B	4.67	0.47
Respondent: Father	4.71	0.45
Respondent: Mother	4.67	0.47
Child: Boy	4.77	0.42
Child: Girl	4.63	0.48
Computer: Own	4.85	0.36
Computer: Plans	4.80	0.40
Computer: No Plans	4.46	0.50

THEME: COMPUTER SIMULATIONS AND EDUCATION

Computer simulations can be used as learning tools.

	MEAN	S.D.
*All Parents	4.29	0.45
Location A	4.25	0.43
Location B	4.44	0.50
Respondent: Father	4.29	0.45
Respondent: Mother	4.29	0.45
Child: Boy	4.41	0.49
Child: Girl	4.19	0.39
Computer: Own	4.62	0.49
Computer: Plans	4.00	0.00
Computer: No Plans	4.15	0.36

Schools should make more use of computer simulations as learning tools.

	MEAN	S.D.
*All Parents	4.00	0.89
Location A	3.92	0.86
Location B	4.22	0.92
Respondent: Father	4.00	0.54
Respondent: Mother	3.96	0.98
Child: Boy	4.29	0.75
Child: Girl	3.69	0.92
Computer: Own	4.46	0.63
Computer: Plans	4.00	0.00
Computer: No Plans	3.69	0.99

THEME: ENJOYMENT OF LEARNING

Enjoyment of learning is important.

	MEAN	S.D.
*All Parents	4.79	0.41
Location A	4.88	0.33
Location B	4.56	0.50
Respondent: Father	4.71	0.45
Respondent: Mother	4.79	0.41
Child: Boy	4.77	0.42
Child: Girl	4.81	0.39
Computer: Own	4.92	0.27
Computer: Plans	4.80	0.40
Computer: No Plans	4.62	0.49

Computer simulations can increase the enjoyment of learning.

	MEAN	S.D.
*All Parents	4.24	0.65
Location A	4.17	0.69
Location B	4.44	0.50
Respondent: Father	4.43	0.50
Respondent: Mother	4.17	0.69
Child: Boy	4.53	0.50
Child: Girl	3.94	0.66
Computer: Own	4.46	0.50
Computer: Plans	4.00	0.00
Computer: No Plans	4.23	0.80

THEME: ABILITY TO USE COMPUTER SIMULATIONS

Elementary children are capable of using computer simulations as learning tools.

	MEAN	S.D.
*All Parents	4.27	0.57
Location A	4.29	0.54
Location B	4.22	0.63
Respondent: Father	4.00	0.54
Respondent: Mother	4.33	0.55
Child: Boy	4.41	0.49
Child: Girl	4.13	0.60
Computer: Own	4.31	0.61
Computer: Plans	4.20	0.40
Computer: No Plans	4.23	0.58

Elementary children should make greater use of computer simulations for learning.

	MEAN	S.D.
*All Parents	3.97	0.87
Location A	3.96	0.84
Location B	4.00	0.94
Respondent: Father	4.00	0.54
Respondent: Mother	3.92	0.95
Child: Boy	4.24	0.81
Child: Girl	3.69	0.85
Computer: Own	4.31	0.72
Computer: Plans	4.00	0.00
Computer: No Plans	3.69	1.07

THEME: COMPUTERS AND GROUP ACTIVITIES

Students working in groups at a computer can learn from each other.

	MEAN	S.D.
*All Parents	4.18	0.63
Location A	4.29	0.46
Location B	3.89	0.88
Respondent: Father	4.29	0.45
Respondent: Mother	4.13	0.67
Child: Boy	4.18	0.79
Child: Girl	4.19	0.53
Computer: Own	4.39	0.49
Computer: Plans	4.00	0.00
Computer: No Plans	4.00	0.79

Allowing children to work together at computer simulations should be encouraged.

	MEAN	S.D.
*All Parents	4.06	0.65
Location A	4.17	0.55
Location B	3.78	0.79
Respondent: Father	4.14	0.35
Respondent: Mother	4.00	0.71
Child: Boy	4.18	0.79
Child: Girl	3.94	0.43
Computer: Own	4.15	0.53
Computer: Plans	4.00	0.00
Computer: No Plans	4.08	0.83

APPENDIX E: COURSEWARE EVALUATIONS

The following evaluations use the questions contained in the PEMC Microware Specifications Form . Permission has been granted to use this form.

Courseware Evaluation: Hurkle

DESCRIPTION:

Package Title : Elementary Mathematics - MM-1 (Hurkle program only)
Volume 1, Version 3.4

Producer : Minnesota Educational Computing Consortium

Distributor : Provincial Educational Media Centre

Subject Area : Social Studies/ Mathematics

Specific Topics : Compass directions/ co-ordinate graphing.

Grade/Ability Level : Grades 2-6

Medium of Transfer : 5 1/4" Flexible Diskette

Hardware : Apple II+ or IIe, 48 K, Disk Drive, Monochrome or Colour Monitor, DOS 3.3.

DEVELOPER'S RATIONALE:

Instructional Purpose : Standard Instruction and Enrichment

Instructional Technique : Game

Duplication and Modification : The program may copied and modified by those districts which have purchased licence from MECC through PEMC.

Documentation : A manual is provided with the diskette.

Instructional Objectives : 1. To teach number line (0 to 10) and co-ordinate locations (0 to 10, -5 to +5). 2. To reinforce compass directions.

Instructional Prerequisites : Reading Level 2.2 (Spache)

Package Content & Structure : The package consists of a diskette and documentation. The diskette contains a number of programs. This review deals with Hurkle only. The directions are easy to understand for the student. If followed in numerical order the content is vertically integrated in presentation. The game format is entertaining and motivating. It can be integrated within a unit on directions and/or graphing. It could also be used as a self-supporting activity.

EVALUATION:

Ratings:

SA - Strongly Agree
A - Agree
D - Disagree
SD - Strongly Disagree
NA - Not Applicable

/H - High Importance
/L - Low Importance

CONTENT

1. The content is accurate.	SA
2. The content has educational value.	SA/H
3. The content presents a balanced view of any social consideration.	NA

INSTRUCTIONAL QUALITY

4. The purpose of the package is well-defined.	A
5. The package achieves its defined purpose.	A
6. Presentation of content is clear and logical.	SA/H
7. The level of difficulty is appropriate for the target audience.	A/H
8. Graphics/colour/sound are used for appropriate instructional reasons.	A/H
9. Use of the package is motivational.	SA/H
10. The package effectively stimulates student creativity.	NA
11. Feedback on student responses is effectively employed.	A/H
12. The learner controls the rate and sequence of presentation/review.	A/H
13. Instruction is integrated with previous student experience.	NA
14. Learning is generalizable to an appropriate range of situations.	A/H

TECHNICAL QUALITY

15. The user support materials are comprehensive.	D
16. The user support manuals are effective.	D
17. Information displays are effective.	SA/H
18. Intended users can easily and independently operate the program.	SA/H
19. Teachers can easily employ the package.	A
20. The program appropriately uses relevant computer capabilities.	A/H
21. The program is reliable in its normal use.	SA/H

OVERALL EVALUATION:

22. I would use or recommend use of this package with little or no change.

Numerical Rating:

Content	4/5
Instructional Characteristics	4/5
Technical Characteristics	4/5

23. Major Strengths : The game format is motivational. Appropriate screen information is provided to guide students. Students enjoy using the program. The knowledge learned is appropriate and useful. The game does not encourage competition between students.

24. Major Weaknesses : The transition from lines to co-ordinate graphs required the input of two numbers separated by a comma. Directions for this were not adequately explained. More teacher support materials would be useful.

25. Potential for Classroom Use : The package can be used to teach compass directions, number line ordering and co-ordinate graphing. Use by small groups encourages co-operative problem solving.

Courseware Evaluation: Oh, Deer !

DESCRIPTION:

Package Title : Oh, Deer !
Version 1

Producer : Minnesota Educational Computing Consortium

Distributor : Provincial Educational Media Centre

Subject Area : Social Studies/ Science

Specific Topics : Wildlife Population Dynamics and Management

Grade/Ability Level : Grades 5 - 9.

Medium of Transfer : 5 1/4" Flexible Diskette

Hardware : Apple II+ or IIe, 48 K, Disk Drive, Colour Monitor, DOS 3.3.

DEVELOPER'S RATIONALE:

Instructional Purpose : Standard Instruction and Enrichment

Instructional Technique : Simulation

Duplication : The program may copied by those districts which have purchased licence from MECC through PEMC.

Documentation : A manual is provided with the diskette.

Instructional Objectives : 1.Students work in teams to explore alternate solutions to problems. 2. Students apply investigative thinking skills to make decisions based on logic and factual information. 3. Students recognize the effect of natural and human-created variables on the natural environment. 4. Students use estimation and computational skills to determine ideal herd siz figures for a defined parcel of land.

Instructional Prerequisites : Reading Level - Grade 6 (Dale-Chall)

Package Content & Structure : The package consists of a diskette and manual. The manual contains teacher instructions, example display screens, student handouts, model information and reference information.

EVALUATION:

Ratings:

SA - Strongly Agree
A - Agree
D - Disagree
SD - Strongly Disagree
NA - Not Applicable

/H - High Importance
/L - Low Importance

CONTENT

1. The content is accurate.	SA/H
2. The content has educational value.	SA/H
3. The content presents a balanced view of any social consideration.	SA/H

INSTRUCTIONAL QUALITY

4. The purpose of the package is well-defined.	SA/H
5. The package achieves its defined purpose.	SA/H
6. Presentation of content is clear and logical.	SA/H
7. The level of difficulty is appropriate for the target audience.	A/H
8. Graphics/colour/sound are used for appropriate instructional reasons.	SA/H
9. Use of the package is motivational.	SA/H
10. The package effectively stimulates student creativity.	SA/H
11. Feedback on student responses is effectively employed.	SA/H
12. The learner controls the rate and sequence of presentation/review.	SA/H
13. Instruction is integrated with previous student experience.	NA
14. Learning is generalizable to an appropriate range of situations.	SA/H

TECHNICAL QUALITY

15. The user support materials are comprehensive.	SA/H
16. The user support manuals are effective.	A/H
17. Information displays are effective.	SA/H
18. Intended users can easily and independently operate the program.	SA/H
19. Teachers can easily employ the package.	A/H
20. The program appropriately uses relevant computer capabilities.	SA/H
21. The program is reliable in its normal use.	SA/H

OVERALL EVALUATION:

22. I would use or recommend use of this package with little or no change.

Numerical Rating:

Content	5/5
Instructional Characteristics	5/5
Technical Characteristics	5/5

23. Major Strengths : The program and manual are well organized. The graphics are done well and colour is used well. Instructions to students are clear and consistent. Program is highly motivating. Model information is well researched including the inclusion of unpredictable variables such as forest fires.

24. Major Weaknesses : The provision of more evaluation activities would prove useful. Proper use of the program may require the introduction of vocabulary needed to understand the operation of the program. There is some repetition in the program during the permit application procedure stage.

25. Potential for Classroom Use : The package should be used in a combination of class and group activities. The learning outcomes fit well into the environmental portion of the elementary science program.

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July 6, 1984

John Godfreyson
Box 321
Lantzville, B.C.
V0R 2H0

Dear Mr. Godfreyson:

Thank you for your interest in the MicroSIFT evaluation procedure. You have our permission to use our form including the parts of it used by the PEMC. As you noted, permission to use their version must come from them.

I wish you success in your project. We would appreciate receiving a copy of the results.

Sincerely,

Donald C. Holznagel

Donald C. Holznagel, Director
Computer Technology Program

DCH:sh

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84 07 06

Mr. John Godfreyson,
Box 321,
Lantzville, B. C.
V0R 2H0

Dear John:

As far as the PEMC is concerned, you may have permission to reproduce the PEMC/MicroSIFT evaluation form.

The MECC materials will, as you know, require clearance from MECC.

Yours truly,

Ken VanApeldoorn,
Coordinator of Evaluation,
Provincial Education Media Centre.

KV/bh

POOR

QUALITY

ORIGINAL